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ANOMALIES

AND

CURIOSITIES OF MEDICINE

BEING

AN ENCYCLOPEDIC COLLECTION OF RARE AND EXTRAORDINARY CASES, AND OF THE MOST STRIKING INSTANCES OF ABNORMALITY IN ALL BRANCHES OF MEDICINE AND SURGERY, DERIVED FROM AN EXHAUSTIVE RESEARCH OF MEDICAL LITERATURE FROM ITS ORIGIN TO THE PRESENT DAY, ABSTRACTED, CLASSIFIED, ANNOTATED, AND INDEXED

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ing it again, but always with the same result—a feeling that I had been poisoned; and yet all the while I liked eggs. Then I never touched them for years. Later I tried again, and I find the ill-effects are gradually wearing off. With my daughter it is different; she, I think, becomes more susceptible as time goes on, and the effect upon her is more violent than in my case at any time. Sometimes an egg has been put with coffee unknown to her, and she has been seen immediately afterward with her face alarmingly changed—eyes swollen and wild, the face crimson, the look of apoplexy. This is her own account: 'An egg in any form causes within a few minutes great uneasiness and restlessness, the throat becomes contracted and painful, the face crimson, and the veins swollen. These symptoms have been so severe as to suggest that serious consequences might follow.' To this I may add that in her experience and my own, the newer the egg, the worse the consequences."

Hutchinson[a] speaks of a Member of Parliament who had an idiosyncrasy as regards **parsley**. After the ingestion of this herb in food he always had alarming attacks of sickness and pain in the abdomen, attended by swelling of the tongue and lips and lividity of the face. This same man could not take the smallest quantity of honey, and certain kinds of fruit always poisoned him. There was a collection of instances of idiosyncrasy in the British Medical Journal, 1859, which will be briefly given in the following lines: One patient could not eat **rice** in any shape without extreme distress. From the description given of his symptoms, spasmodic asthma seemed to be the cause of his discomfort. On one occasion when at a dinner-party he felt the symptoms of rice-poisoning come on, and, although he had partaken of no dish ostensibly containing rice, was, as usual, obliged to retire from the table. Upon investigation it appeared that some white soup with which he had commenced his meal had been thickened with ground rice. As in the preceding case there was another gentleman who could not eat rice without a sense of suffocation. On one occasion he took lunch with a friend in chambers, partaking only of simple bread and cheese and bottled beer. On being seized with the usual symptoms of rice-poisoning he informed his friend of his peculiarity of constitution, and the symptoms were explained by the fact that a few grains of rice had been put into each bottle of beer for the purpose of exciting a secondary fermentation. The same author speaks of a gentleman under treatment for stricture who could not eat **figs** without experiencing the most unpleasant formication of the palate and fauces. The fine dust from split **peas** caused the same sensation, accompanied with running at the nose; it was found that the father of the patient suffered from hay-fever in certain seasons. He also says a certain young lady after eating eggs suffered from swelling of the tongue and throat, accompanied by "alarming illness," and there is recorded in the same paragraph a history of another young girl in

[a] 1 § iv. 78

whom the ingestion of honey, and especially honey-comb, produced swelling of the tongue, frothing of the mouth, and blueness of the fingers. The authors know of a gentleman in whom sneezing is provoked on the ingestion of chocolate in any form. There was another instance—in a member of the medical profession—who suffered from urticaria after eating **veal.** Veal has the reputation of being particularly indigestible, and the foregoing instance of the production of urticaria from its use is doubtless not an uncommon one.

Overton[a] cites a striking case of constitutional peculiarity or idiosyncrasy in which **wheat flour** in any form, the staff of life, an article hourly prayed for by all Christian nations as the first and most indispensable of earthly blessings, proved to one unfortunate individual a prompt and dreadful poison. The patient's name was David Waller, and he was born in Pittsylvania County, Va., about the year 1780. He was the eighth child of his parents, and, together with all his brothers and sisters, was stout and healthy. At the time of observation Waller was about fifty years of age. He had dark hair, gray eyes, dark complexion, was of bilious and irascible temperament, well formed, muscular and strong, and in all respects healthy as any man, with the single exception of his peculiar idiosyncrasy. He had been the subject of but few diseases, although he was attacked by the epidemic of 1816. From the history of his parents and an inquiry into the health of his ancestry, nothing could be found which could establish the fact of heredity in his peculiar disposition. Despite every advantage of stature, constitution, and heredity, David Waller was through life, from his cradle to his grave, the victim of what is possibly a unique idiosyncrasy of constitution. In his own words he declared: "Of two equal quantities of tartar and wheat flour, not more than a dose of the former, he would rather swallow the tartar than the wheat flour." If he ate flour in any form or however combined, in the smallest quantity, in two minutes or less he would have painful itching over the whole body, accompanied by severe colic and tormina in the bowels, great sickness in the stomach, and continued vomiting, which he declared was ten times as distressing as the symptoms caused by the ingestion of tartar emetic. In about ten minutes after eating the flour the itching would be greatly intensified, especially about the head, face, and eyes, but tormenting all parts of the body, and not to be appeased. These symptoms continued for two days with intolerable violence, and only declined on the third day and ceased on the tenth. In the convalescence, the lungs were affected, he coughed, and in expectoration raised great quantities of phlegm, and really resembled a phthisical patient. At this time he was confined to his room with great weakness, similar to that of a person recovering from an asthmatic attack. The mere smell of wheat produced distressing symptoms in a minor degree, and for this reason he could not, without suf-

[a] Southern Journal of Medical and Physical Sciences, iii., 1855.

fering, go into a mill or house where the smallest quantity of wheat flour was kept. His condition was the same from the earliest times, and he was laid out for dead when an infant at the breast, after being fed with "pap" thickened with wheat flour. Overton remarks that a case of constitutional peculiarity so little in harmony with the condition of other men could not be received upon vague or feeble evidence, and it is therefore stated that Waller was known to the society in which he lived as an honest and truthful man. One of his female neighbors, not believing in his infirmity, but considering it only a whim, put a small quantity of flour in the soup which she gave him to eat at her table, stating that it contained no flour, and as a consequence of the deception he was bed-ridden for ten days with his usual symptoms. It was also stated that Waller was never subjected to militia duty because it was found on full examination of his infirmity that he could not live upon the rations of a soldier, into which wheat flour enters as a necessary ingredient. In explanation of this strange departure from the condition of other men, Waller himself gave a reason which was deemed equivalent in value to any of the others offered. It was as follows: His father being a man in humble circumstances in life, at the time of his birth had no wheat with which to make flour, although his mother during gestation "longed" for wheat-bread. The father, being a kind husband and responsive to the duty imposed by the condition of his wife, procured from one of his opulent neighbors a bag of wheat and sent it to the mill to be ground. The mother was given much uneasiness by an unexpected delay at the mill, and by the time the flour arrived her strong appetite for wheat-bread had in a great degree subsided. Notwithstanding this, she caused some flour to be immemediately baked into bread and ate it, but not so freely as she had expected. The bread thus taken caused intense vomiting and made her violently and painfully ill, after which for a considerable time she loathed bread. These facts have been ascribed as the cause of the lamentable infirmity under which the man labored, as no other peculiarity or impression in her gestation was noticed. In addition it may be stated that for the purpose of avoiding the smell of flour Waller was in the habit of carrying camphor in his pocket and using snuff, for if he did not smell the flour, however much might be near him, it was as harmless to him as to other men.

The authors know of a case in which the eating of any raw fruit would produce in a lady symptoms of asthma; cooked fruit had no such effect.

Food-Superstitions.—The superstitious abhorrence and antipathy to various articles of food that have been prevalent from time to time in the history of the human race are of considerable interest and well deserve some mention here. A writer in a prominent journal has studied this subject with the following result:—

"From the days of Adam and Eve to the present time there has been not only forbidden fruit, but forbidden meats and vegetables. For one reason or

another people have resolutely refused to eat any and all kinds of flesh, fish, fowl, fruits, and plants. Thus, the apple, the pear, the strawberry, the quince, the bean, the onion, the leek, the asparagus, the woodpecker, the pigeon, the goose, the deer, the bear, the turtle, and the eel—these, to name only a few eatables, have been avoided as if unwholesome or positively injurious to health and digestion.

"As we all know, the Jews have long had an hereditary antipathy to **pork**. On the other hand, swine's flesh was highly esteemed by the ancient Greeks and Romans. This fact is revealed by the many references to pig as a dainty bit of food. At the great festival held annually in honor of Demeter, roast pig was the *pièce de résistance* in the bill of fare, because the pig was the sacred animal of Demeter. Aristophanes in 'The Frogs' makes one of the characters hint that some of the others 'smell of roast pig.' These people undoubtedly had been at the festival (known as the Thesmophoria) and had eaten freely of roast pig. Those who took part in another Greek mystery or festival (known as the Eleusinia) abstained from certain food, and above all from beans.

"Again, as we all know, mice are esteemed in China and in some parts of India. But the ancient Egyptians, Greeks, and Jews abhorred mice and would not touch mouse-meat. Rats and field-mice were sacred in Old Egypt, and were not to be eaten on this account. So, too, in some parts of Greece, the mouse was the sacred animal of Apollo, and mice were fed in his temples. The chosen people were forbidden to eat 'the weasel, and the mouse, and the tortoise after his kind.' These came under the designation of unclean animals, which were to be avoided.

"But people have abstained from eating kinds of flesh which could not be called unclean. For example, the people of Thebes, as Herodotus tells us, abstained from sheep. Then, the ancients used to abstain from certain vegetables. In his 'Roman Questions' Plutarch asks: 'Why do the Latins abstain strictly from the flesh of the woodpecker?' In order to answer Plutarch's question correctly it is necessary to have some idea of the peculiar custom and belief called '**totemism.**' There is a stage of society in which people claim descent from and kinship with beasts, birds, vegetables, and other objects. This object, which is a 'totem,' or family mark, they religiously abstain from eating. The members of the tribe are divided into clans or stocks, each of which takes the name of some animal, plant, or object, as the bear, the buffalo, the woodpecker, the asparagus, and so forth. No member of the bear family would dare to eat bear-meat, but he has no objection to eating buffalo steak. Even the marriage law is based on this belief, and no man whose family name is Wolf may marry a woman whose family name is also Wolf.

"In a general way it may be said that almost all our food prohibitions spring from the extraordinary custom generally called totemism. Mr. Swan, who was missionary for many years in the Congo Free State, thus de-

scribes the custom: 'If I were to ask the Yeke people why they do not eat zebra flesh, they would reply, '*Chijila,*' *i.e.*, 'It is a thing to which we have an antipathy;' or better, 'It is one of the things which our fathers taught us not to eat.' So it seems the word 'Bashilang' means 'the people who have an antipathy to the leopard;' the 'Bashilamba,' 'those who have an antipathy to the dog,' and the 'Bashilanzefu,' 'those who have an antipathy to the elephant.' In other words, the members of these stocks refuse to eat their totems, the zebra, the leopard, or the elephant, from which they take their names.

"The survival of antipathy to certain foods was found among people as highly civilized as the Egyptians, the Greeks, and the Romans. Quite a list of animals whose flesh was forbidden might be drawn up. For example, in Old Egypt the sheep could not be eaten in Thebes, nor the goat in Mendes, nor the cat in Bubastis, nor the crocodile at Ombos, nor the rat, which was sacred to Ra, the sun-god. However, the people of one place had no scruples about eating the forbidden food of another place. And this often led to religious disputes.

"Among the vegetables avoided as food by the Egyptians may be mentioned the onion, the garlic, and the leek. Lucian says that the inhabitants of Pelusium adored the onion. According to Pliny the Egyptians relished the leek and the onion. Juvenal exclaims: 'Surely a very religious nation, and a blessed place, where every garden is overrun with gods!' The survivals of totemism among the ancient Greeks are very interesting. Families named after animals and plants were not uncommon. One Athenian *gens*, the Ioxidæ, had for its ancestral plant the asparagus. One Roman *gens*, the Piceni, took a woodpecker for its totem, and every member of this family refused, of course, to eat the flesh of the woodpecker. In the same way as the nations of the Congo Free State, the Latins had an antipathy to certain kinds of food. However, an animal or plant forbidden in one place was eaten without any compunction in another place. 'These local rites in Roman times,' says Mr. Lang, 'caused civil brawls, for the customs of one town naturally seemed blasphemous to neighbors with a different sacred animal. Thus when the people of dog-town were feeding on the fish called oxyrrhyncus, the citizens of the town which revered the oxyrrhyncus began to eat dogs. Hence arose a riot.' The antipathy of the Jews to pork has given rise to quite different explanations. The custom is probably a relic of totemistic belief. That the unclean animals—animals not to be eaten—such as the pig, the mouse, and the weasel, were originally totems of the children of Israel, Professor Robertson Smith believes is shown by various passages in the Old Testament.

"When animals and plants ceased to be held sacred they were endowed with sundry magical or mystic properties. The apple has been supposed to possess peculiar virtues, especially in the way of health. 'The relation of

the apple to health,' says Mr. Conway, 'is traceable to Arabia. Sometimes it is regarded as a bane. In Hessia it is said an apple must not be eaten on New Year's Day, as it will produce an abscess. But generally it is curative. In Pomerania it is eaten on Easter morning against fevers; in Westphalia (mixed with saffron) against jaundice; while in Silesia an apple is scraped from top to stalk to cure diarrhea, and upward to cure costiveness.' According to an old English fancy, if any one who is suffering from a wound in the head should eat strawberries it will lead to fatal results. In the South of England the folk say that the devil puts his cloven foot upon the blackberries on Michaelmas Day, and hence none should be gathered or eaten after that day. On the other hand, in Scotland the peasants say that the devil throws his cloak over the blackberries and makes them unwholesome after that day, while in Ireland he is said to stamp on the berries. Even that humble plant, the cabbage, has been invested with some mystery. It was said that the fairies were fond of its leaves, and rode to their midnight dances on cabbage-stalks. The German women used to say that 'Babies come out of the cabbage-heads.' The Irish peasant ties a cabbage-leaf around the neck for sore throat. According to Gerarde, the Spartans ate watercress with their bread, firmly believing that it increased their wit and wisdom. The old proverb is, 'Eat cress to learn more wit.'

"There is another phase to food-superstitions, and that is the theory that the qualities of the eaten pass into the eater. Mr. Tylor refers to the habit of the Dyak young men in abstaining from deer-meat lest it should make them timid, while the warriors of some South American tribes eat the meat of tigers, stags, and boars for courage and speed. He mentions the story of an English gentleman at Shanghai who at the time of the Taeping attack met his Chinese servant carrying home the heart of a rebel, which he intended to eat to make him brave. There is a certain amount of truth in the theory that the quality of food does affect the mind and body. Buckle in his 'History of Civilization' took this view, and tried to prove that the character of a people depends on their diet."

Idiosyncrasies to Drugs.—In the absorption and the assimilation of drugs idiosyncrasies are often noted; in fact, they are so common that we can almost say that no one drug acts in the same degree or manner on different individuals. In some instances the untoward action assumes such a serious aspect as to render extreme caution necessary in the administration of the most inert substances. A medicine ordinarily so bland as cod-liver oil may give rise to disagreeable eruptions. Christison speaks of a boy ten years old who was said to have been killed by the ingestion of two ounces of Epsom salts without inducing purgation; yet this common purge is universally used without the slightest fear or caution. On the other hand, the extreme tolerance exhibited by certain individuals to certain drugs offers a new phase of this subject. There are well-authenticated cases on record in which death

has been caused in children by the ingestion of a small fraction of a grain of opium. While exhibiting especial tolerance from peculiar disposition and long habit, Thomas De Quincey, the celebrated English litterateur, makes a statement in his "Confessions" that with impunity he took as much as 320 grains of opium a day, and was accustomed at one period of his life to call every day for "a glass of laudanum negus, warm, and without sugar," to use his own expression, after the manner a toper would call for a "hot-Scotch."

The individuality noted in the assimilation and the ingestion of drugs is functional as well as anatomic. Numerous cases have been seen by all physicians. The severe toxic symptoms from a whiff of cocain-spray, the acute distress from the tenth of a grain of morphin, the gastric crises and profuse urticarial eruptions following a single dose of quinin,—all are proofs of it. The "personal equation" is one of the most important factors in therapeutics, reminding us of the old rule, "Treat the patient, not the disease."

The idiosyncrasy may be either temporary or permanent, and there are many conditions that influence it. The time and place of administration; the degree of pathologic lesion in the subject; the difference in the physiologic capability of individual organs of similar nature in the same body; the degree of human vitality influencing absorption and resistance; the peculiar epochs of life; the element of habituation, and the grade and strength of the drug, influencing its virtue,—all have an important bearing on untoward action and tolerance of poisons.

It is not in the province of this work to discuss at length the explanations offered for these individual idiosyncrasies. Many authors have done so, and Lewin[a] has devoted a whole volume to this subject, of which, fortunately, an English translation has been made by Mulheron,[b] and to these the interested reader is referred for further information. In the following lines examples of idiosyncrasy to the most common remedial substances will be cited, taking the drugs up alphabetically.

Acids.—Ordinarily speaking, the effect of **boric acid** in medicinal doses on the human system is nil, an exceptionally large quantity causing diuresis. Binswanger, according to Lewin, took eight gm. in two doses within an hour, which was followed by nausea, vomiting, and a feeling of pressure and fulness of the stomach which continued several hours. Molodenkow[c] mentions two fatal cases from the external employment of boric acid as an antiseptic. In one case the pleural cavity was washed out with a five per cent. solution of boric acid and was followed by distressing symptoms, vomiting, weak pulse, erythema, and death on the third day. In the second case, in a youth of sixteen, death occurred after washing out a deep abscess of the nates with the same solution. The autopsy revealed no change or signs indicative of the cause of death. Hogner[d] mentions two instances of death from the employ-

[a] "Die Nebenwirkungen der Arzneimittel."

[b] "The Untoward Effect of Drugs." Detroit, 1884. [c] 704, 1881, No. 42. [d] 720, ccii., 38.

ment of 2½ per cent. solution of boric acid in washing out a dilated stomach. The symptoms were quite similar to those mentioned by Molodenkow.

In recent years the medical profession has become well aware that in its application to wounds it is possible for **carbolic acid** or **phenol** to exercise exceedingly deleterious and even fatal consequences. In the earlier days of antisepsis, when operators and patients were exposed for some time to an atmosphere saturated with carbolic spray, toxic symptoms were occasionally noticed. Von Langenbeck [a] spoke of severe carbolic-acid intoxication in a boy in whom carbolic paste had been used in the treatment of abscesses. The same author reports two instances of death following the employment of dry carbolized dressings after slight operations. Kohler [b] mentions the death of a man suffering from scabies who had applied externally a solution containing about a half ounce of phenol. Rose spoke of gangrene of the finger after the application of carbolized cotton to a wound thereon. In some cases phenol acts with a rapidity equal to any poison. Taylor speaks of a man who fell unconscious ten seconds after an ounce of phenol had been ingested, and in three minutes was dead. There is recorded an account of a man of sixty-four who was killed by a solution containing slightly over a dram of phenol. A half ounce has frequently caused death; smaller quantities have been followed by distressing symptoms, such as intoxication (which Olshausen has noticed to follow irrigation of the uterus), delirium, singultus, nausea, rigors, cephalalgia, tinnitus aurium, and anasarca. Hind [c] mentions recovery after the ingestion of nearly six ounces of crude phenol of 14 per cent. strength. There was a case at the Liverpool Northern Hospital [d] in which recovery took place after the ingestion with suicidal intent of four ounces of crude carbolic acid. Quoted by Lewin, Busch accurately describes a case which may be mentioned as characteristic of the symptoms of carbolism. A boy, suffering from abscess under the trochanter, was operated on for its relief. During the few minutes occupied by the operation he was kept under a two per cent. carbolic spray, and the wound was afterward dressed with carbolic gauze. The day following the operation he was seized with vomiting, which was attributed to the chloroform used as an anesthetic. On the following morning the bandages were removed under the carbolic spray; during the day there was nausea, in the evening there was collapse, and carbolic acid was detected in the urine. The pulse became small and frequent and the temperature sank to 35.5° C. The frequent vomiting made it impossible to administer remedies by the stomach, and, in spite of hypodermic injections and external application of analeptics, the boy died fifty hours after operation.

Recovery has followed the ingestion of an ounce of officinal **hydrochloric acid.** [e] Black [f] mentions a man of thirty-nine who recovered after swallow-

[a] 199, 1878, No. 48. [b] 720, clv., 276. [c] 476, 1884, i., 659.
[d] 548, 1875, ii., 597. [e] 218, xv. [f] 476, 1886, ii., 14.

ing 1½ ounces of commercial hydrochloric acid. Johnson[a] reports a case of poisoning from a dram of hydrochloric acid. Tracheotomy was performed, but death resulted.

Burman[b] mentions recovery after the ingestion of a dram of dilute **hydrocyanic acid** of Scheele's strength (2.4 gm. of the acid). In this instance insensibility did not ensue until two minutes after taking the poison, the retarded digestion being the means of saving life.

Quoting Taafe, in 1862 Taylor speaks of the case of a man who swallowed the greater part of a solution containing an ounce of **potassium cyanid.** In a few minutes the man was found insensible in the street, breathing stertorously, and in ten minutes after the ingestion of the drug the stomach-pump was applied. In two hours vomiting began, and thereafter recovery was rapid.

Mitscherlich speaks of erosion of the gums and tongue with hemorrhage at the slightest provocation, following the long administration of **dilute nitric acid.** This was possibly due to the local action.

According to Taylor, the smallest quantity of **oxalic acid** causing death is one dram. Ellis[c] describes a woman of fifty who swallowed an ounce of oxalic acid in beer. In thirty minutes she complained of a burning pain in the stomach and was rolling about in agony. Chalk and water was immediately given to her and she recovered. Woodman[d] reports recovery after taking ½ ounce of oxalic acid.

Salicylic acid in medicinal doses frequently causes untoward symptoms, such as dizziness, transient delirium, diminution of vision, headache, and profuse perspiration; petechial eruptions and intense gastric symptoms have also been noticed.

Sulphuric acid causes death from its corrosive action, and when taken in excessive quantities it produces great gastric disturbance; however, there are persons addicted to taking oil of vitriol without any apparent untoward effect. There is mentioned a boot-maker[e] who constantly took ½ ounce of the strong acid in a tumbler of water, saying that it relieved his dyspepsia and kept his bowels open.

Antimony.—It is recorded that ¾ grain of tartar emetic has caused death in a child and two grains in an adult. Falot[f] reports three cases in which after small doses of tartar emetic there occurred vomiting, delirium, spasms, and such depression of vitality that only the energetic use of stimulants saved life. Beau[g] mentions death following the administration of two doses of 1½ gr. of tartar emetic. Preparations of antimony in an ointment applied locally have caused necrosis, particularly of the cranium, and Hebra[407] has long since denounced the use of tartar emetic ointment in affections of the scalp. Carpenter[h] mentions recovery after ingestion of two

[a] 224, 1871, i., 221. [b] 476, 1854, i., 39. [c] 476, 1864, 265. [d] 548, 1864, ii., 386.
[e] 548, 1861, i., 295. [f] 789, 1852, 245. [g] 548, 1857, i., 320. [h] 491, 1893, 514.

drams of tartar emetic. Behrends[a] describes a case of catalepsy with mania, in which a dose of 40 gr. of tartar emetic was tolerated, and Morgagni speaks of a man who swallowed two drams, immediately vomited, and recovered. Instances like the last, in which an excessive amount of a poison by its sudden emetic action induces vomiting before there is absorption of a sufficient quantity to cause death, are sometimes noticed. McCreery[b] mentions a case of accidental poisoning with half an ounce of tartar emetic successfully treated with green tea and tannin. Mason[c] reports recovery after taking 80 gr. of tartar emetic.

Arsenic.—The **sources of arsenical poisoning** are so curious as to deserve mention. Confectionery, wall-paper, dyes, and the like are examples. In other cases we note money-counting,[d] the colored candles of a Christmas tree,[e] paper collars,[f] ball-wreaths of artificial flowers,[g] ball-dresses made of green tarlatan,[h] playing cards,[i] hat-lining,[j] and fly-papers.[k]

Bazin has reported a case in which erythematous pustules appeared after the exhibition during fifteen days of the $\frac{5}{6}$ gr. of arsenic. Macnal[l] speaks of an eruption similar to that of measles in a patient to whom he had given but three drops of Fowler's solution for the short period of three days. Pareira says that in a gouty patient for whom he prescribed $\frac{1}{6}$ gr. of potassium arseniate daily, on the third day there appeared a bright red eruption of the face, neck, upper part of the trunk and flexor surfaces of the joints, and an edematous condition of the eyelids. The symptoms were preceded by restlessness, headache, and heat of the skin, and subsided gradually after the second or third day, desquamation continuing for nearly two months. After they had subsided entirely, the exhibition of arsenic again aroused them, and this time they were accompanied by salivation. Charcot and other French authors have noticed the frequent occurrence of suspension of the sexual instinct during the administration of Fowler's solution. Jackson[m] speaks of recovery after the ingestion of two ounces of arsenic by the early employment of an emetic. Walsh[n] reports a case in which 600 gr. of arsenic were taken without injury. The remarkable tolerance of arsenic eaters is well known. Taylor asserts that the smallest lethal dose of arsenic has been two gr., but Tardieu mentions an instance in which ten cgm. ($1\frac{1}{2}$ gr.) has caused death. Mackenzie[o] speaks of a man who swallowed a large quantity of arsenic in lumps, and received no treatment for sixteen hours, but recovered. It is added that from two masses passed by the anus 105 gr. of arsenic were obtained.

In speaking of the tolerance of **belladonna,** in 1859 Fuller mentioned a

[a] 587, ix., 199. [b] 124, 1853. [c] 224, 1877, i., 674. [d] 491, 1883, 526.
[e] 536, 1889, i., 287. [f] 224, 1880, ii., 240. [g] 548, 1862, i., 137.
[h] 476, 1875, ii., 758. [i] 224, 1879, ii., 630. [j] 224, 1879, ii., 746.
[k] 476, 1884, i., 408. [l] 548, 1868. [m] 124, July, 1858.
[n] Annalist, N. Y., 1849, 136. [o] 435, 1872.

child of fourteen who in eighteen days took 37 grains of atropin; a child of ten who took seven grains of extract of belladonna daily, or more than two ounces in twenty-six days; and a man who took 64 grains of the extract of belladonna daily, and from whose urine enough atropin was extracted to kill two white mice and to narcotize two others. Bader has observed grave symptoms following the employment of a vaginal suppository containing three grains of the extract of belladonna. The dermal manifestations, such as urticaria and eruptions resembling the exanthem of scarlatina, are too well known to need mention here. An enema containing 80 grains of belladonna root has been followed in five hours by death, and Taylor[757] has mentioned recovery after the ingestion of three drams of belladonna. In 1864 Chambers reported to the Lancet the recovery of a child of four years who took a solution containing ½ grain of the alkaloid. In some cases the idiosyncrasy to belladonna is so marked that violent symptoms follow the application of the ordinary belladonna plaster. Maddox[a] describes a case of poisoning in a music teacher by the belladonna plaster of a reputable maker. She had obscure eye-symptoms, and her color-sensations were abnormal. Locomotor equilibration was also affected. Golden[b] mentions two cases in which the application of belladonna ointment to the breasts caused suppression of the secretion of milk. Goodwin[c] relates the history of a case in which an infant was poisoned by a belladonna plaster applied to its mother's breast and died within twenty-four hours after the first application of the plaster. In 1881 Betancourt spoke of an instance of inherited susceptibility to belladonna, in which the external application of the ointment produced all the symptoms of belladonna poisoning. Cooper[d] mentions the symptoms of poisoning following the application of extract of belladonna to the scrotum. Davison reports poisoning by the application of belladonna liniment. Jenner and Lyman also record belladonna poisoning from external applications.

Rosenthal[e] reports a rare case of poisoning in a child eighteen months old who had swallowed about a teaspoonful of **benzin.** Fifteen minutes later the child became unconscious. The stomach-contents, which were promptly removed, contained flakes of bloody mucus. At the end of an hour the radial pulse was scarcely perceptible, respiration was somewhat increased in frequency and accompanied with a rasping sound. The breath smelt of benzin. The child lay in quiet narcosis, occasionally throwing itself about as if in pain. The pulse gradually improved, profuse perspiration occurred, and normal sleep intervened. Six hours after the poisoning the child was still stupefied. The urine was free from albumin and sugar, and the next morning the little one had perfectly recovered.

There is an instance mentioned[f] of a robust youth of twenty who by a mistake took a half ounce of **cantharides.** He was almost immediately

[a] 124, 1893. [b] 476, 1856. [c] 545, 1871, 346.
[d] 224, 1877, i., 164. [e] Therap. Gaz., July 16, 1894. [f] 476, 1825, 233.

seized with violent heat in the throat and stomach, pain in the head, and intense burning on urination. These symptoms progressively increased, were followed by intense sickness and almost continual vomiting. In the evening he passed great quantities of blood from the urethra with excessive pain in the urinary tract. On the third day all the symptoms were less violent and the vomiting had ceased. Recovery was complete on the fifteenth day.

Digitalis has been frequently observed to produce dizziness, fainting, disturbances of vision, vomiting, diarrhea, weakness of the pulse, and depression of temperature. These phenomena, however, are generally noticed after continued administration in repeated doses, the result being doubtless due to cumulative action caused by abnormally slow elimination by the kidneys. Traube[a] observed the presence of skin-affection after the use of digitalis in a case of pericarditis. Tardieu has seen a fluid-dram of the tincture of digitalis cause alarming symptoms in a young woman who was pregnant. He also quotes cases of death on the tenth day from ingestion of 20 grains of the extract, and on the fifth day from 2½ grams of the infusion. Köhnhorn[b] mentions a death from what might be called chronic digitalis poisoning.

There is a deleterious practice of some of the Irish peasantry connected with their belief in fairies, which consists of giving a cachetic or rachitic child large doses of a preparation of fox-glove (Irish—luss-more, or great herb), to drive out or kill the fairy in the child. It was supposed to kill an unhallowed child and cure a hallowed one. In the Hebrides, likewise, there were many cases of similar poisoning.

Epidemics of **ergotism** have been recorded from time to time since the days of Galen, and were due to poverty, wretchedness, and famine, resulting in the feeding upon ergotized bread. According to Wood,[829] gangrenous ergotism, or "Ignis Sacer" of the Middle Ages, killed 40,000 persons in Southwestern France in 922 A. D., and in 1128–29, in Paris alone, 14,000 persons perished from this malady. It is described as commencing with itchings and formications in the feet, severe pain in the back, contractions in the muscles, nausea, giddiness, apathy, with abortion in pregnant women, in suckling women drying of milk, and in maidens with amenorrhea. After some time, deep, heavy aching in the limbs, intense feeling of coldness, with real coldness of the surfaces, profound apathy, and a sense of utter weariness develop; then a dark spot appears on the nose or one of the extremities, all sensibility is lost in the affected part, the skin assumes a livid red hue, and adynamic symptoms in severe cases deepen as the gangrene spreads, until finally death ensues. Very generally the appetite and digestion are preserved to the last, and not rarely there is a most ferocious hunger. Wood also mentions a species of ergotism characterized by epileptic paroxysms, which he calls "spasmodic ergotism." Prentiss[c] mentions a brunette of forty-two, under the influence of ergot, who exhibited a peculiar depression of

[a] 263, i., 622. [b] 476, 1876, i., 583. [c] 450, 1889, No. 26, 912.

spirits with hysteric phenomena, although deriving much benefit from the administration of the drug from the hemorrhage caused by uterine fibroids. After taking ergot for three days she felt like crying all the time, became irritable, and stayed in bed, being all day in tears. The natural disposition of the patient was entirely opposed to these manifestations, as she was even-tempered and exceptionally pleasant.

In addition to the instance of the fatal ingestion of a dose of **Epsom salts** already quoted, Lang [a] mentions a woman of thirty-five who took four ounces of this purge. She experienced burning pain in the stomach and bowels, together with a sense of asphyxiation. There was no purging or vomiting, but she became paralyzed and entered a state of coma, dying fifteen minutes after ingestion.

Iodin Preparations.—The eruptions following the administration of small doses of **potassium iodid** are frequently noticed (Fig. 189), and at the same time large quantities of albumin have been seen in the urine. Potassium iodid, although generally spoken of as a poisonous drug, by gradually increasing the dose can be given in such enormous quantities as to be almost beyond the bounds of credence, several drams being given at a dose. On the other hand, eight grains have produced alarming symptoms.[b] In the extensive use of **iodoform** as a dressing instances of untoward effects, and even fatal ones, have been noticed, the majority of them being due to careless and injudicious application. In a French journal [c] there is mentioned the history of a man of twenty-five, suspected of urethral ulceration, who submitted to the local application of one gram of iodoform. Deep narcosis and anesthesia were induced, and two hours after awakening his breath smelled strongly of iodoform. There are two similar instances recorded in England.[d]

Fig. 189.—A somewhat rare form of eruption from the ingestion of iodin compounds (after J. C. McGuire).

Pope [e] mentions two fatal cases of **lead-poisoning** from diachylon plaster, self-administered for the purpose of producing abortion. Lead water-pipes, the use of cosmetics and hair-dyes, coloring matter in confectionery and in pastry, habitual biting of silk threads, imperfectly burnt pottery, and cooking bread with painted wood [f] have been mentioned as causes of chronic lead-poisoning.

[a] 476, 1891. [b] 133, xxvi., 197. [c] Le Practicien, Mar. 17, 1879.
[d] 476, May 31, 1879. [e] 224, 1893. [f] 653, 1877, 349.

Mercury.—Armstrong[a] mentions recovery after ingestion of 1½ drams of corrosive sublimate, and Lodge[b] speaks of recovery after a dose containing 100 grains of the salt. It is said[c] that a man swallowed 80 grains of mercuric chlorid in whiskey and water, and vomited violently about ten minutes afterward. A mixture of albumin and milk was given to him, and in about twenty-five minutes a bolus of gold-leaf and reduced iron; in eight days he perfectly recovered. Severe and even fatal poisoning may result from the external application of mercury. Meeres[d] mentions a case in which a solution (two grains to the fluid-ounce) applied to the head of a child of nine for the relief of tinea tonsurans caused diarrhea, profuse salivation, marked prostration, and finally death. Washing out the vagina with a solution of corrosive sublimate, 1 : 2000, has caused severe and even fatal poisoning.[e] Bonet[216] mentions death after the inunction of a mercurial ointment, and instances of distressing salivation from such medication are quite common. There are various dermal affections which sometimes follow the exhibition of mercury and assume an erythematous type. The susceptibility of some persons to calomel, the slightest dose causing profuse salivation and painful oral symptoms, is so common that few physicians administer mercury to their patients without some knowledge of their susceptibility to this drug. Blundel[f] relates a curious case occurring in the times when mercury was given in great quantities, in which to relieve obstinate constipation a half ounce of crude mercury was administered and repeated in twelve hours. Scores of globules of mercury soon appeared over a vesicated surface, the result of a previous blister applied to the epigastric region. Blundel, not satisfied with the actuality of the phenomena, submitted his case to Dr. Lister, who, after careful examination, pronounced the globules metallic.

Oils.—Mauvezin[g] tells of the ingestion of three drams of **croton oil** by a child of six, followed by vomiting and rapid recovery. There was no diarrhea in this case. Wood quotes Cowan in mentioning the case of a child of four, who in two days recovered from a teaspoonful of croton oil taken on a full stomach. Adams saw recovery in an adult after ingestion of the same amount. There is recorded[h] an instance of a woman who took about an ounce, and, emesis being produced three-quarters of an hour afterward by mustard, she finally recovered. There is a record in which so small a dose as three minims is supposed to have killed a child of thirteen months.[i] According to Wood, Giacomini mentions a case in which 24 grains of the drug proved fatal in as many hours.

Castor oil is usually considered a harmless drug, but the castor bean, from which it is derived, contains a poisonous acrid principle, three such beans having sufficed to produce death in a man. Doubtless some of the in-

[a] 491, 1887, 120.
[b] 224, 1888, ii., 720.
[c] 124, 1863, 340.
[d] 476, Sept. 16, 1871.
[e] 261, 1887, No. 47.
[f] 476, 1830, 767.
[g] 363, 1369, 290.
[h] 218, 1868, i., 294.
[i] 548, 1870, i.

stances in which castor oil has produced symptoms similar to cholera are the results of the administration of contaminated oil.

The untoward effects of **opium and its derivatives** are quite numerous. Gaubius treated an old woman in whom, after three days, a single grain of opium produced a general desquamation of the epidermis; this peculiarity was not accidental, as it was verified on several other occasions. Hargens[452] speaks of a woman in whom the slightest bit of opium in any form produced considerable salivation. Gastric disturbances are quite common, severe vomiting being produced by minimum doses; not infrequently, intense mental confusion, vertigo, and headache, lasting hours and even days, sometimes referable to the frontal region and sometimes to the occipital, are seen in certain nervous individuals after a dose of from $\frac{1}{4}$ to $\frac{5}{6}$ gr. of opium. These symptoms were familiar to the ancient physicians, and, according to Lewin, Tralles reports an observation with reference to this in a man, and says regarding it in rather unclassical Latin: " . . . per multos dies ponderosissimum caput circumgestasse." Convulsions are said to be observed after medicinal doses of opium. Albers[a] states that twitching in the tendons, tremors of the hands, and even paralysis, have been noticed after the ingestion of opium in even ordinary doses. The "pruritus opii," so familiar to physicians, is spoken of in the older writings. Dioscorides, Paulus Aegineta, and nearly all the writers of the last century describe this symptom as an annoying and unbearable affection. In some instances the ingestion of opium provokes an eruption in the form of small, isolated red spots, which, in their general character, resemble roseola. Rieken[b] remarks that when these spots spread over all the body they present a scarlatiniform appearance, and he adds that even the mucous membranes of the mouth and throat may be attacked with erethematous inflammation. Behrend[c] observed an opium exanthem, which was attended by intolerable itching, after the exhibition of a quarter of a grain. It was seen on the chest, on the inner surfaces of the arms, on the flexor surfaces of the forearms and wrists, on the thighs, and posterior and inner surfaces of the legs, terminating at the ankles in a stripe-like discoloration about the breadth of three fingers. It consisted of closely disposed papules of the size of a pin-head, and several days after the disappearance of the eruption a fine, bran-like desquamation of the epidermis ensued. Brand[d] has also seen an eruption on the trunk and flexor surfaces, accompanied with fever, from the ingestion of opium. Billroth[e] mentions the case of a lady in whom appeared a feeling of anxiety, nausea, and vomiting after ingestion of a small fraction of a grain of opium; she would rather endure her intense pain than suffer the untoward action of the drug. According to Lewin, Brochin[f] reported a case in which the idiosyncrasy to morphin was so great that $\frac{1}{25}$ of a grain of the drug administered

[a] 161, xxvi., 225. [b] 720, cvii., 22. [c] 199, 1879, 626.
[d] 199, 1879, 718. [e] 611, 1868, 763. [f] 363, 1877, 226.

hypodermically caused irregularity of the respiration, suspension of the heart-beat, and profound narcosis. According to the same authority, Wernich has called attention to paresthesia of the sense of taste after the employment of morphin, which, according to his observation, is particularly prone to supervene in patients who are much reduced and in persons otherwise healthy who have suffered from prolonged inanition. These effects are probably due to a central excitation of a similar nature to that produced by santonin. Persons thus attacked complain, shortly after the injection, of an intensely sour or bitter taste, which for the most part ceases after elimination of the morphin. Von Graefe and Sommerfrodt speak of a spasm of accommodation occurring after ingestion of medicinal doses of morphin. There are several cases on record[a] in which death has been produced in an adult by the use of $\frac{1}{2}$ to $\frac{1}{6}$ grain of morphin. According to Wood, the maximum doses from which recovery has occurred without emesis are 55 grains of solid opium, and six ounces of laudanum. According to the same authority, in 1854 there was a case in which a babe one day old was killed by one minim of laudanum, and in another case a few drops of paregoric proved fatal to a child of nine months. Doubtful instances of death from opium are given, one in an adult female[b] after 30 grains of Dover's powder given in divided doses, and another[c] after a dose of $\frac{1}{4}$ grain of morphin. Yavorski[d] cites a rather remarkable instance of morphin-poisoning with recovery: a female took 30 grains of acetate of morphin, and as it did not act quickly enough she took an additional dose of $\frac{1}{2}$ ounce of laudanum. After this she slept a few hours, and awoke complaining of being ill. Yavorski saw her about an hour later, and by producing emesis, and giving coffee, atropin, and tincture of musk, he saved her life. Pyle[e] describes a pugilist of twenty-two who, in a fit of despondency after a debauch (in which he had taken repeated doses of morphin sulphate), took with suicidal intent three teaspoonfuls of morphin; after rigorous treatment he revived and was discharged on the next day perfectly well. Potassium permanganate was used in this case. Chaffee[f] speaks of recovery after the ingestion of 18 grains of morphin without vomiting.

In **chronic opium eating** the amount of this drug which can be ingested with safety assumes astounding proportions. In his "Confessions" De Quincey remarks: "Strange as it may sound, I had a little before this time descended suddenly and without considerable effort from 320 grains of opium (8000 drops of laudanum) per day to 40 grains, or $\frac{1}{8}$ part. Instantaneously, and as if by magic, the cloud of profoundest melancholy which rested on my brain, like some black vapors that I have seen roll away from the summits of the mountains, drew off in one day,—passed off with its murky banners as simultaneously as a ship that has been stranded and is floated off by a spring-tide—

'That moveth altogether, if it move at all.'

[a] 829, 168. [b] 269, July, 1882. [c] 218, Jan. 3, 1885.
[d] 812, 1885. [e] 533, May 12, 1894. [f] 545, 1882, xlvii., 697.

Now, then, I was again happy; I took only a thousand drops of laudanum per day, and what was that? A latter spring had come to close up the season of youth; my brain performed its functions as healthily as ever before; I read Kant again, and again I understood him, or fancied that I did." There have been many authors who, in condemning De Quincey for unjustly throwing about the opium habit a halo of literary beauty which has tempted many to destruction, absolutely deny the truth of his statements. No one has any stable reason on which to found denial of De Quincey's statements as to the magnitude of the doses he was able to take; and his frankness and truthfulness is equal to that of any of his detractors. William Rosse Cobbe, in a volume entitled "Dr. Judas, or Portrayal of the Opium Habit," gives with great frankness of confession and considerable purity of diction a record of his own experiences with the drug. One entire chapter of Mr. Cobbe's book and several portions of other chapters are devoted to showing that De Quincey was wrong in some of his statements, but notwithstanding his criticism of De Quincey, Mr. Cobbe seems to have experienced the same adventures in his dreams, showing, after all, that De Quincey knew the effects of opium, even if he seemed to idealize it. According to Mr. Cobbe, there are in the United States upward of two millions of victims of enslaving drugs entirely exclusive of alcohol. Cobbe mentions several instances in which De Quincey's dose of 320 grains of opium daily has been surpassed. One man, a resident of Southern Illinois, consumed 1072 grains a day; another in the same State contented himself with 1685 grains daily; and still another is given whose daily consumption amounted to 2345 grains per day. In all cases of laudanum-takers it is probable that analysis of the commercial laudanum taken would show the amount of opium to be greatly below that of the officinal proportion, and little faith can be put in the records of large amounts of opium taken when the deduction has been made from the laudanum used. Dealers soon begin to know opium victims, and find them ready dupes for adulteration. According to Lewin, Samter mentions a case of morphin-habit which was continued for three years, during which, in a period of about three hundred and twenty-three days, upward of 2½ ounces of morphin was taken daily. According to the same authority, Eder reports still larger doses. In the case observed by him the patient took laudanum for six years in increasing doses up to one ounce per day; for eighteen months, pure opium, commencing with 15 grains and increasing to 2¼ drams daily; and for eighteen months morphin, in commencing quantities of six grains, which were later increased to 40 grains a day. When deprived of their accustomed dose of morphin the sufferings which these patients experience are terrific, and they pursue all sorts of deceptions to enable them to get their enslaving drug. Patients have been known to conceal tubes in their mouths, and even swallow them, and the authors know of a fatal instance in which a tube of hypodermic tablets of the drug was found concealed in the rectum.

The administration of such an inert substance as the infusion of **orange-peel** has been sufficient to invariably produce nervous excitement in a patient afflicted with carcinoma.

Sonnenschein refers to a case of an infant of five weeks who died from the effects of one **phosphorous** match head containing only $\frac{1}{100}$ grain of phosphorus. There are certain people who by reason of a special susceptibility cannot tolerate phosphorus, and the exhibition of it causes in them nausea, oppression, and a feeling of pain in the epigastric region, tormina and tenesmus, accompanied with diarrhea, and in rare cases jaundice, sometimes lasting several months. In such persons $\frac{1}{30}$ grain is capable of causing the foregoing symptoms. In 1882 a man was admitted to Guy's Hospital, London, after he had taken half of a sixpenny pot of phosphorous paste in whiskey, and was subsequently discharged completely recovered.

A peculiar feature of phosphorus-poisoning is necrosis of the jaw. This affection was first noticed in 1838, soon after the introduction of the manufacture of phosphorous matches. In late years, owing to the introduction of precautions in their manufacture, the disease has become much less common. The tipping of the match sticks is accomplished by dipping their ends in a warm solution of a composition of phosphorus, chlorate of potassium, with particles of ground flint to assist friction, some coloring agent, and Irish glue. From the contents of the dipping-pans fumes constantly arise into the faces of the workmen and dippers, and in cutting the sticks and packing the matches the hands are constantly in contact with phosphorus. The region chiefly affected in this poisoning is the jaw-bone, but the inflammation may spread to the adjoining bones and involve the vomer, the zygoma, the body of the sphenoid bone, and the basilar process of the occipital bone. It is supposed that conditions in which the periosteum is exposed are favorable to the progress of the disease, and, according to Hirt, workmen with diseased teeth are affected three times as readily as those with healthy teeth, and are therefore carefully excluded from some of the factories in America.

Prentiss of Washington, D. C., in 1881[a] reported a remarkable case of **pilocarpin** idiosyncrasy in a blonde of twenty-five. He was consulted by the patient for constipation. Later on symptoms of cystitis developed, and an ultimate diagnosis of pyelitis of the right kidney was made. Uremic symptoms were avoided by the constant use of pilocarpin. Between December 16, 1880, and February 22, 1881, the patient had 22 sweats from pilocarpin. The action usually lasted from two to six hours, and quite a large dose was at length necessary. The idiosyncrasy noted was found in the hair, which at first was quite light, afterward chestnut-brown, and May 1, 1881, almost pure black. The growth of the hair became more vigorous and thicker than formerly, and as its color darkened it became coarser in proportion. In March, 1889, Prentiss saw his patient, and at that time her hair was

[a] 547, July 2, 1881.

dark brown, having returned to that color from black. Prentiss also reported the following case[a] as adding another to the evidence that jaborandi will produce the effect mentioned under favorable circumstances: Mrs. L., aged seventy-two years, was suffering from Bright's disease (contracted kidney). Her hair and eyebrows had been snow-white for twenty years. She suffered greatly from itching of the skin, due to the uremia of the kidney-disease; the skin was harsh and dry. For this symptom fluid extract of jaborandi was prescribed with the effect of relieving the itching. It was taken in doses of 20 or 30 drops several times a day, from October, 1886, to February, 1888. During the fall of 1887 it was noticed by the nurse that the eyebrows were growing darker, and that the hair of the head was darker in patches. These patches and the eyebrows continued to become darker, until at the time of her death they were quite black, the black tufts on the head presenting a very curious appearance among the silver-white hairs surrounding them.

Quinin being such a universally used drug, numerous instances of idiosyncrasy and intolerance have been recorded. Chevalier[b] mentions that through contact of the drug workmen in the manufacture of quinin are liable to an affection of the skin which manifests itself in a vesicular, papular, or pustular eruption on different parts of the body. Vepan[c] mentions a lady who took 1½ grains and afterward 2½ grains of quinin for neuralgia, and two days afterward her body was covered with purpuric spots, which disappeared in the course of nine days but reappeared after the administration of the drug was resumed. Lewin says that in this case the severity of the eruption was in accordance with the size of the dose, and during its existence there was bleeding at the gums; he adds that Gouchet also noticed an eruption of this kind in a lady who after taking quinin expectorated blood. The petechiæ were profusely spread over the entire body, and they disappeared after the suspension of the drug. Daubœuf, Garraway,[d] Hemming,[e] Skinner,[f] and Cöbner[g] mention roseola and scarlatiniform erythema after minute doses of quinin. In nearly all these cases the accompanying symptoms were different. Heusinger[h] speaks of a lady who, after taking ½ grain of quinin, experienced headache, nausea, intense burning, and edema, together with nodular erythema on the eyelids, cheeks, and portion of the forehead. At another time 1½ grains of the drug gave rise to herpetic vesicles on the cheeks, followed by branny desquamation on elimination of the drug. In other patients intense itching is experienced after the ingestion of quinin. Peters[i] cites an instance of a woman of sixty-five who, after taking one grain of quinin, invariably exhibited after an hour a temperature of from 104° to 105° F., accelerated pulse, rigors, slight delirium, thirst, and all the appearances of

[a] 727, Oct. 3, 1890.
[b] 141, 1851, T. lxviii., 5.
[c] 369, 1865.
[d] 224, 1869, ii., 388.
[e] 224, 1869, ii., 533.
[f] 224, 1870, i., 103.
[g] 199, 1877, 305.
[h] 199, 1877, 361.
[i] 476, 1889, ii., 727.

ill-defined fever, which would pass off in from twelve to twenty-four hours. Peters witnessed this idiosyncrasy several times and believed it to be permanent. The most unpleasant of the untoward symptoms of quinin exhibition are the disturbances of the organs of special sense. Photophobia, and even transient amblyopia, have been observed to follow small doses. In the examination of cases of the untoward effects of quinin upon the eye, Knapp of New York found the power of sight diminished in various degrees, and rarely amaurosis and immobility of the pupils. According to Lewin, the perceptions of color and light are always diminished, and although the disorder may last for some time the prognosis is favorable. The varieties of the disturbances of the functions of the ear range from tinnitus aurium to congestion causing complete deafness. The gastro-intestinal and genito-urinary tracts are especially disposed to untoward action by quinin. There is a case recorded in which, after the slightest dose of quinin, tingling and burning at the meatus urinarius were experienced. According to Lewin, there is mentioned in the case reported by Gauchet a symptom quite unique in the literature of quinin, viz., hemoptysis. Simon de Ronchard [a] first noted the occurrence of several cases of hemoptysis following the administration of doses of eight grains daily. In the persons thus attacked the lungs and heart were healthy. Hemoptysis promptly ceased with the suspension of the drug. When it was renewed, blood again appeared in the sputa. Taussig [b] mentions a curious mistake, in which an ounce of quinin sulphate was administered to a patient at one dose; the only symptoms noticed were a stuporous condition and complete deafness. No antidote was given, and the patient perfectly recovered in a week. In malarious countries, and particularly in the malarial fevers of the late war, enormous quantities of quinin were frequently given. In fact, at the present day in some parts of the South quinin is constantly kept on the table as a prophylactic constituent of the diet.

Skinner [c] noticed the occurrence of a scarlatiniform eruption in a woman after the dose of $\frac{1}{165}$ grain of **strychnin**, which, however, disappeared with the discontinuance of the drug. There was a man in London in 1865 [d] who died in twenty minutes after the ingestion of $\frac{1}{2}$ grain of strychnin. Wood speaks of a case in which the administration of $\frac{1}{100}$ grain killed a child three and one-half months old. Gray [e] speaks of a man who took 22 grains and was not seen for about an hour. He had vomited some of it immediately after taking the dose, and was successfully treated with chloral hydrate. A curious case is mentioned in which three mustard plasters, one on the throat, one on the back of the neck, and another on the left shoulder of a woman, produced symptoms similar to strychnin poisoning. They remained in position for about thirty minutes, and about thirty hours afterward a painful stinging sensation commenced in the back of the neck, followed by violent

[a] 363, Jan., 1861. [b] 548, 1864, i., 461. [c] 224, 1870, i., 303.
[d] 392, 1865, xi., 208. [e] 224, 1880, i., 476.

twitching of the muscles of the face, arms, and legs, which continued in regular succession through the whole of the night, but after twelve hours yielded to hot fomentations of poppy-heads applied to the back of the neck. It could not be ascertained whether any medicine containing strychnin had been taken, but surely, from the symptoms, such must have been the case.

Tobacco.—O'Neill[a] gives the history of a farmer's wife, aged forty, who wounded her leg against a sewing-machine, and by lay advice applied a handful of chopped wet tobacco to it, from which procedure, strange to say, serious **nicotin-poisoning** ensued. The pupils were dilated, there were dimness of vision, confusion of thought, and extreme prostration. The pulse was scarcely apparent, the skin was white and wet with clammy perspiration. Happily, strychnin was given in time to effect recovery, and without early medical assistance she would undoubtedly have succumbed. There are several similar cases on record.

Although not immediately related to the subject of idiosyncrasy, the following case may be mentioned here: Ramadge[b] speaks of a young Frenchman, suffering from an obstinate case of gonorrhea, who was said to have been completely cured by living in a newly painted house in which he inhaled the odors or vapors of turpentine.

White[c] speaks of a case of exanthematous eruption similar to that of ivy-poison in mother and child, which was apparently caused by playing with and burning the toy called "Pharaoh's serpent egg."

The **idiosyncrasies noticed in some persons during coitus** are quite interesting. The Ephemerides mentions a person in whom coitus habitually caused vomiting, and another in whom excessive sexual indulgence provoked singultus. Sometimes exaggerated tremors or convulsions, particularly at the moment of orgasm, are noticed. Females especially are subject to this phenomenon, and it is seen sometimes in birds.

Winn[d] reports the case of a man who, when prompted to indulge in sexual intercourse, was immediately prior to the act seized with a fit of sneezing. Even the thought of sexual pleasure with a female was sufficient to provoke this peculiar idiosyncrasy.

Sullivan[e] mentions a bride of four weeks, who called at the doctor's office, saying that in coitus her partner had no difficulty until the point of culmination or orgasm, when he was seized with complete numbness and lost all pleasurable sensation in the penis. The numbness was followed by a sensation of pain, which was intensified on the slightest motion, and which was at times so excruciating as to forbid separation for upward of an hour, or until the penis had become flaccid. The woman asked for advice for her unfortunate husband's relief, and the case was reported as a means of obtaining suggestions from the physicians over the country. In response, one

[a] 476, 1879, i., 296. [b] 476, 1829–30, i., 415. [c] 331, 1867.
[d] 703, 1873, x., 318. [e] 569, 1879, ii., 225.

theory was advanced that this man had been in the habit of masturbating and had a stricture of the membranous portion of the urethra. associated with an ulcer of the prostate involving the ejaculatory ducts, or an inflammatory condition of all the tissues compressed by the ejaculatory muscles.

Hendrichsen[a] quotes a case in which a spasmodic contraction of the levator ani occurred during coitus, and the penis could not be withdrawn while this condition lasted; and in support of this circumstance Hendrichsen mentions that Marion Sims, Beigel, and Budin describe spasmodic contractions of the levator ani, constricting the vagina; he also cites an instance under his personal observation in which this spasm was excited by both vaginal and rectal examination, although on the following day no such condition could be produced. In this connection, among the older writers, Borellus[841] gives the history of a man who before coitus rubbed his virile member with musk, and, similar to the connection of a dog and bitch, was held fast in his wife's vagina; it was only after the injection of great quantities of water to soften the parts that separation was obtained. Diemerbroeck[304] confirms this singular property of musk by an analogous observation, in which the ludicrous method of throwing cold water on the persons was practised. Schurig also relates the history of a similar instance.

Among the peculiar effects of coitus is its deteriorating effect on the healing process of wounds. Boerhaave, Paré, and Fabricius Hildanus all speak of this untoward effect of venery, and in modern times Poncet has made observations at a hospital in Lyons which prove that during the process of healing wounds are unduly and harmfully influenced by coitus, and cites confirmatory instances. Poncet also remarks that he found on nine occasions, by placing a thermometer in the rectum, that the temperature was about 1° F. lower just before than after coitus, and that during the act the temperature gradually rose above normal.

There are many associate conditions which, under the exciting influence of coitus, provoke harmful effects and even a fatal issue. Deguise[b] mentions a man who had coitus 18 times in ten hours with most disastrous effects. Cabrolius[245] speaks of a man who took a potion of aphrodisiac properties, in which, among other things, he put an enormous dose of cantharides. The anticipation of the effect of his dose, that is, the mental influence, in addition to the actual therapeutic effect, greatly distressed and excited him. Almost beyond belief, it is said that he approached his wife eighty-seven times during the night, spilling much sperm on the sleeping-bed. Cabrolius was called to see this man in the morning, and found him in a most exhausted condition, but still having the supposed consecutive ejaculations. Exhaustion progressed rapidly, and death soon terminated this erotic crisis. Lawson is accredited with saying that among the Marquesan tribe he knew of a woman who during a single night had intercourse with 103 men.

[a] 839, Band xxiii., Heft i.

[b] 664, T. vii., 113.

Among the older writers there are instances reported in which erection and ejaculation took place without the slightest pleasurable sensation. Claudius exemplifies this fact in his report of a Venetian merchant who had vigorous erections and ejaculations of thick and abundant semen without either tingling or pleasure.

Attila, King of the Huns, and one of the most celebrated leaders of the German hosts which overran the Roman Empire in its decline, and whose enormous army and name inspired such terror that he was called the "Scourge of God," was supposed to have died in coitus. Apoplexy, organic heart disorders, aneurysms, and other like disorders are in such cases generally the direct cause of death, coitus causing the death indirectly by the excitement and exertion accompanying the act.

Bartholinus, Benedictus, Borellus, Pliny, Morgagni, Plater, à Castro, Forestus, Marcellus Donatus, Schurig, Sinibaldus, Schenck, the Ephemerides, and many others mention death during coitus; the older writers in some cases attributed the fatal issue to excessive sexual indulgence, not considering the possibility of the associate direct cause, which most likely would have been found in case of a necropsy.

Suspended Animation.—Various opinions have been expressed as to the length of time compatible with life during which a person can stay under water. Recoveries from drowning furnish interesting examples of the suspension of animation for a protracted period, but are hardly ever reliable, as the subject at short intervals almost invariably rises to the surface of the water, allowing occasional respiration. Taylor[757] mentions a child of two who recovered after ten minutes' submersion; in another case a man recovered after fourteen minutes' submersion. There is a case reported in this country [a] of a woman who was said to have been submerged twenty minutes. Guérard [b] quotes a case happening in 1774, in which there was submersion for an hour with subsequent recovery; but there hardly seems sufficient evidence of this.

Green [c] mentions submersion for fifteen minutes; Douglass,[d] for fourteen minutes; Laub,[e] for fifteen minutes; Povall [f] gives a description of three persons who recovered after a submersion of twenty-five minutes. There is a case in French literature,[g] apparently well authenticated, in which submersion for six minutes was followed by subsequent recovery.

There have been individuals who gave exhibitions of **prolonged submersion** in large glass aquariums, placed in full view of the audience. Taylor remarks that the person known some years ago in London as "Lurline" could stay under water for three minutes. There have been several exhibitionists of this sort. Some of the more enterprising seat themselves on an artificial coral, and surrounded by fishes of divers hues complacently eat a meal while thus submerged. It is said that quite recently in Detroit there

[a] 124, 1853, 348. [b] 141, 1850, ii., 306. [c] 629, 1732–44. [d] 490, 1842, i., 448.
[e] 425, 1868. [f] 819, 1828. [g] 789, 1871, 3 s. xii., 293.

was a performer who accomplished the feat of remaining under water four minutes and eight seconds in full view of the audience. Miss Lurline swam about in her aquarium, which was brilliantly illuminated, ate, reclined, and appeared to be taking a short nap during her short immersion. In Paris, some years since, there was exhibited a creature called "l'homme-poisson," who performed feats similar to Lurline, including the smoking of a cigarette held entirely in his mouth. In all these exhibitions all sorts of artificial means are used to make the submersion appear long. Great ceremony, music, and the counting of the seconds in a loud voice from the stage, all tend to make the time appear much longer than it really is. However, James Finney in London, April 7, 1886, stayed under water four minutes, twenty-nine and one-fourth seconds, and one of his feats was to pick up 70 or 80 gold-plated half-pennies with his mouth, his hands being securely tied behind his back, and never emerging from his tank until his feat was fully accomplished. In company with his sister he played a game of "nap" under water, using porcelain cards and turning them to the view of the audience. "Professor Enochs" recently stayed under water at Lowell, Mass., for four minutes, forty-six and one-fifth seconds. The best previous record was four minutes, thirty-five seconds, made by "Professor Beaumont" at Melbourne on December 16, 1893.

For the most satisfactory examples of prolonged submersion we must look to the **divers**, particularly the natives who trade in coral, and the pearl fishers. Diving is an ancient custom, and even legendary exploits of this nature are recorded. Homer compares the fall of Hector's chariot to the action of a diver; and specially trained men were employed at the Siege of Syracuse, their mission being to laboriously scuttle the enemy's vessels. Many of the old historians mention diving, and Herodotus speaks of a diver by the name of Scyllias who was engaged by Xerxes to recover some articles of value which had been sunk on some Persian vessels in a tempest. Egyptian divers are mentioned by Plutarch, who says that Anthony was deceived by Cleopatra in a fishing contest by securing expert divers to place the fish upon the hooks. There was a historical or rather legendary character by the name of Didion, who was noted for his exploits in the river Meuse. He had the ability to stay under water a considerable length of time, and even to catch fish while submerged.

There was a famous diver in Sicily at the end of the fifteenth century whose feats are recorded in the writings of Alexander ab Alexandro, Pontanus, and Father Kircher, the Jesuit savant. This man's name was Nicolas, born of poor parents at Catania. From his infancy he showed an extraordinary power of diving and swimming, and from his compatriots soon acquired various names indicative of his capacity. He became very well known throughout Sicily, and for his patron had Frederick, King of Naples. In the present day, the sponge-fishers and pearl-fishers in the West Indies, the

Mediterranean, the Indian Seas, and the Gulf of Mexico invite the attention of those interested in the anomalies of suspended animation. There are many marvelous tales of their ability to remain under water for long periods. It is probable that none remain submerged over two minutes, but, what is more remarkable, they are supposed to dive to extraordinary depths, some as much as 150 to 200 feet. Ordinarily they remain under water from a minute to one and a half minutes. Remaining longer, the face becomes congested, the eyes injected, the sputum bloody, due to rupture of some of the minute vessels in the lung. It is said by those who have observed them carefully that few of these divers live to an advanced age. Many of them suffer apoplectic attacks, and some of them become blind from congestion of the ocular vessels. The Syrian divers are supposed to carry weights of considerable size in their hands in order to facilitate the depth and duration of submersion. It is also said that the divers of Oceanica use heavy stones. According to Guyot-Daubès,[504] in the Philippine Isles the native pearl-fishers teach their children to dive to the depth of 25 meters. The Tahitians, who excited the admiration of Cook, are noted for their extraordinary diving. Speaking of the inhabitants of the island of Fakaraya, near Tahiti, de la Quesnerie says that the pearl-fishers do not hesitate to dive to the depth even of 100 feet after their coveted prizes. On the Ceylon coast the mother-of-pearl fishers are under the direction of the English Government, which limits the duration and the practice of this occupation. These divers are generally Cingalese, who practise the exercise from infancy. As many as 500 small boats can be seen about the field of operation, each equipped with divers. A single diver makes about ten voyages under the water, and then rests in the bottom of the boat, when his comrade takes his place. Among other native divers are the Arabs of Algeria and some of the inhabitants of the Mexican coast.

It might be well to mention here the divers who work by means of apparatus. The ancients had knowledge of contrivances whereby they could stay under water some time. Aristotle speaks of an instrument by which divers could rest under water in communication with the air, and compares it with the trunk of an elephant wading a stream deeper than his height. In the presence of Charles V. diving bells were used by the Greeks in 1540. In 1660 some of the cannon of the sunken ships of the Spanish Armada were raised by divers in diving bells. Since then various improvements in submarine armor have been made, gradually evolving into the present perfected diving apparatus of to-day, by which men work in the holds of vessels sunk in from 120 to 200 feet of water. The enormous pressure of the water at these great depths makes it necessary to have suits strong enough to resist it. Lambert, a celebrated English diver, recovered £90,000 in specie from the steamer Alphonso XII., a Spanish mail boat belonging to the Lopez line, which sank off Point Gando, Grand Canary, in 26½ fathoms of water. For nearly six months the salvage party, despatched by the underwriters in May,

1885, persevered in the operations; two divers lost their lives, the golden bait being in the treasure-room beneath the three decks, but Lambert finished the task successfully.

Deep-sea divers only acquire proficiency after long training. It is said that as a rule divers are indisposed to taking apprentices, as they are afraid of their vocation being crowded and their present ample remuneration diminished. At present there are several schools. At Chatham, England, there is a school of submarine mining, in which men are trained to lay torpedoes and complete harbor defense. Most of these divers can work six hours at a time in from 35 to 50 feet of water. Divers for the Royal Navy are trained at Sheerness. When sufficiently trained to work at the depth of 150 feet seamen-divers are fully qualified, and are drafted to the various ships. They are connected with an air-pump in charge of trustworthy men; they signal for their tools and material, as well as air, by means of a special line for this purpose. At some distance below the water the extraordinary weight of the suits cannot be felt, and the divers work as well in armor as in ordinary laboring clothes. One famous diver says that the only unpleasant experience he ever had in his career as a diver, not excepting the occasion of his first dive, was a drumming in the ears, as a consequence of which, after remaining under water at a certain work for nine hours, he completely lost the use of one ear for three months, during which time he suffered agony with the earache. These men exhibit absolute indifference to the dangers attached to their calling, and some have been known to sleep many fathoms beneath the surface. Both by means of their signal lines and by writing on a slate they keep their associates informed of the progress of their work.

Suspension of the Pulse.—In some cases the pulse is not apparent for many days before actual death, and there have been instances in which, although the pulse ceased for an extended period, the patient made an ultimate recovery. In reviewing the older literature we find that Ballonius[185] mentions an instance in which the pulse was not apparent for fourteen days before complete asphyxia. Ramazzini[660] describes a case of cessation of the pulse four days before death. Schenck[718] details the history of a case in which the pulse ceased for three days and asphyxia was almost total, but the patient eventually recovered. There is a noteworthy observation[a] in which there was cessation of the pulse for nine days without a fatal issue.

Some persons seem to have a preternatural control over their circulatory system, apparently enabling them to produce **suspension of cardiac movement at will.** Cheyne speaks of a Colonel Townshend who appeared to possess the power of dying, as it were, at will,—that is, so suspending the heart's action that no pulsation could be detected. After lying in this state of lifelessness for a short period, life would become slowly established without any consciousness or volition on the man's part. The longest period in

[a] 282, 1732, 287.

which he remained in this death-like condition was about thirty minutes. A postmortem examination of this person was awaited with great interest; but after his death nothing was found to explain the power he possessed over his heart.

Saint Augustin knew of a priest named Rutilut who had the power of voluntarily simulating death. Both the pulsation and respiration was apparently abolished when he was in his lifeless condition. Burning and pricking left visible effects on the skin after his recovery, but had no apparent effect on his lethargy. Chaillé [a] reports an instance of voluntary suspension of the pulse.

Relative to **hibernation,** it is well-known that mice, snakes, and some reptiles, as well as bees, sometimes seem to entirely suspend animation for an extended period, and especially in the cold weather. In Russia fish are transported frozen stiff, but return to life after being plunged into cold water. A curious tale is told by Harley, from Sir John Lubbock, of a snail brought from Egypt and thought to be dead. It was placed on a card and put in position on a shelf in the British Museum in March, 1845. In March, 1850, after having been gummed to a label for five years, it was noticed to have an apparent growth on its mouth and was taken out and placed in water, when it soon showed signs of life and ate cabbage leaves offered to it. It has been said, we think with credible evidence, that cereal seeds found in the tombs with mummies have grown when planted, and Harley quotes an instance of a gentleman who took some berries, possibly the remnants of Pharaoh's daughter's last meal, coming as they did from her mummified stomach after lying dormant in an Egyptian tomb many centuries, and planted them in his garden, where they soon grew, and he shortly had a bush as flourishing as any of those emanating from fresh seeds.

Human hibernation is an extremely rare anomaly. Only the **fakirs of India** seem to have developed this power, and even the gifted ones there are seldom seen. Many theories have been advanced to explain this ability of the fakirs, and many persons have discredited all the stories relative to their powers; on the other hand, all who have witnessed their exhibitions are convinced of their genuineness. Furthermore, these persons are extremely scarce and are indifferent to money; none has been enticed out of his own country to give exhibitions. When one dies in a community, his place is never filled—proving that he had no accomplices who knew any fraudulent secret practices, otherwise the accomplice would soon step out to take his place. These men have undoubtedly some extraordinary mode of sending themselves into a long trance, during which the functions of life are almost entirely suspended. We can readily believe in their ability to fast during their periods of burial, as we have already related authentic instances of fasting for a great length of time, during which the individual exercised his normal functions.

[a] 593, xvi., 388.

To the fakir, who neither visibly breathes nor shows circulatory movements, and who never moves from his place of confinement, fasting should be comparatively easy, when we consider the number of men whose minds were actively at work during their fasts, and who also exercised much physical power.

Harley [a] says that the fakirs begin their performances by taking a large dose of the powerfully stupefying "bang," thus becoming narcotized. In this state they are lowered into a cool, quiet tomb, which still further favors the prolongation of the artificially induced vital lethargy; in this condition they rest for from six to eight weeks. When resurrected they are only by degrees restored to life, and present a wan, haggard, debilitated, and wasted appearance. Braid [b] is credited, on the authority of Sir Claude Wade, with stating that a fakir was buried in an unconscious state at Lahore in 1837, and when dug up, six weeks later, he presented all the appearances of a dead person. The legs and arms were shrunken and stiff, and the head reclined on the shoulder in a manner frequently seen in a corpse. There was no pulsation of the heart or arteries of the arm or temple—in fact, no really visible signs of life. By degrees this person was restored to life. Every precaution had been taken in this case to prevent the possibility of fraud, and during the period of interment the grave was guarded night and day by soldiers of the regiment stationed at Lahore.

Honigberger,[c] a German physician in the employ of Runjeet Singh, has an account of a fakir of Punjaub who allowed himself to be buried in a well-secured vault for such a long time that grain sown in the soil above the vault sprouted into leaf before he was exhumed. Honigberger affirms that the time of burial was over 40 days, and that on being submitted to certain processes the man recovered and lived many years after. Sir Henry Lawrence verified the foregoing statements. The chest in which the fakir was buried was sealed with the Runjeet stamp on it, and when the man was brought up he was cold and apparently lifeless. Honigberger also states that this man, whose name was Haridas, was four months in a grave in the mountains; to prove the absolute suspension of animation, the chin was shaved before burial, and at exhumation this part was as smooth as on the day of interment. This latter statement naturally calls forth comment when we consider the instances that are on record of the growth of beard and hair after death.

There is another account of a person of the same class who had the power of suspending animation,[d] and who would not allow his coffin to touch the earth for fear of worms and insects, from which he is said to have suffered at a previous burial.

It has been stated that the fakirs are either eunuchs or hermaphrodites,

[a] 548, 1861, ii., 733.
[b] "Treatise on Human Hibernation," 1850.
[c] 548, 1870, i., 21.
[d] Calcutta Med. Jour., 1835.

social outcasts, having nothing in common with the women or men of their neighborhood; but Honigberger mentions one who disproved this ridiculous theory by eloping to the mountains with his neighbor's wife.

Instances of **recovery after asphyxia from hanging** are to be found, particularly among the older references of a time when hanging was more common than it is to-day. Bartholinus,[189] Blegny,[215] Camerarius,[247] Morgagni,[576] Pechlin,[621] Schenck,[718] Stoll,[751] and Wepfer[a] all mention recovery after hanging. Forestus[348] describes a case in which a man was rescued by provoking vomiting with vinegar, pepper, and mustard seed. There is a case on record[b] in which a person was saved after hanging nineteen minutes. There was a case of a man brought into the Hôpital Saint-Louis[c] asphyxiated by strangulation, having been hung for some time. His rectal temperature was only 93.3° F., but six hours after it rose to 101.6° F., and he subsequently recovered. Taylor[d] cites the instance of a stout woman of forty-four who recovered from hanging. When the woman was found by her husband she was hanging from the top of a door, having been driven to suicide on account of his abuse and intemperance. When first seen by Taylor she was comatose, her mouth was surrounded by white froth, and the swollen tongue protruded from it. Her face was bloated, her lips of a darkened hue, and her neck of a brown parchment-color. About the level of the larynx, the epidermis was distinctly abraded, indicating where the rope had been. The conjunctiva was insensible and there was no contractile response of the pupil to the light of a candle. The reflexes of the soles of the feet were tested, but were quite in abeyance. There was no respiratory movement and only slight cardiac pulsation. After vigorous measures the woman ultimately recovered. Recovery is quite rare when the asphyxiation has gone so far, the patients generally succumbing shortly after being cut down or on the following day. Chevers[266] mentions a most curious case, in which cerebral congestion from the asphyxiation of strangling was accidentally relieved by an additional cut across the throat. The patient was a man who was set upon by a band of **Thugs** in India, who, pursuant to their usual custom, strangled him and his fellow-traveler. Not being satisfied that he was quite dead, one of the band returned and made several gashes across his throat. This latter action effectually relieved the congestion caused by the strangulation and undoubtedly saved his life, while his unmutilated companion was found dead. After the wounds in his throat had healed this victim of the Thugs gave such a good description of the murderous band that their apprehension and execution soon followed.

Premature Burial.—In some instances simulation of death has been so exact that it has led to premature interment. There are many such cases on record, and it is a popular superstition of the laity that all the gruesome tales

a "Exercit. in Apoplex.," 181.

b 200, x., 242.

c 476, 1870, i., 446.

d 381, 1880, ii., 387.

are true of persons buried alive and returning to life, only to find themselves hopelessly lost in a narrow coffin many feet below the surface of the earth. Among the lower classes the dread of being buried before life is extinct is quite generally felt, and for generations the medical profession have been denounced for their inability to discover an infallible sign of death. Most of the instances on record, and particularly those from lay journals, are vivid exaggerations, drawn from possibly such a trivial sign as a corpse found with the fist tightly clenched or the face distorted, which are the inspiration of the horrible details of the dying struggles of the person in the coffin. In the works of Fontenelle there are 46 cases recorded of the premature interment of the living, in which apparent has been mistaken for real death. None of these cases, however, are sufficiently authentic to be reliable. Moreover, in all modern methods of burial, even if life were not extinct, there could be no possibility of consciousness or of struggling. Absolute asphyxiation would soon follow the closing of the coffin lid.

We must admit, however, that the mistake has been made, particularly in instances of catalepsy or trance, and during epidemics of malignant fevers or plagues, in which there is an absolute necessity of hasty burial for the prevention of contagion. In a few instances on the battle-field sudden syncope, or apparent death, has possibly led to premature interment; but in the present day this is surely a very rare occurrence. There is also a danger of mistake from cases of asphyxiation, drowning, and similar sudden suspensions of the vital functions.

It is said that in the eighty-fourth Olympiad, Empedocles restored to life a woman who was about to be buried, and that this circumstance induced the Greeks, for the future protection of the supposed dead, to establish laws which enacted that no person should be interred until the sixth or seventh day. But even this extension of time did not give satisfaction, and we read that when Hephestion, at whose funeral obsequies Alexander the Great was present, was to be buried his funeral was delayed until the tenth day. There is also a legend that when Acilius Aviola fell a victim to disease he was burned alive, and although he cried out, it was too late to save him, as the fire had become so widespread before life returned.

While returning to his country house Asclepiades, a physician denominated the "God of Physic," and said to have been a descendant of Æsculapius, saw during the time of Pompey the Great a crowd of mourners about to start a fire on a funeral pile. It is said that by his superior knowledge he perceived indications of life in the corpse and ordered the pile destroyed, subsequently restoring the supposed deceased to life. These examples and several others of a similar nature induced the Romans to delay their funeral rites, and laws were enacted to prevent haste in burning, as well as in interment. It was not until the eighth day that the final rites were performed, the days immediately subsequent to death having their own special ceremonies. The

Turks were also fearful of premature interment and subjected the defunct to every test; among others, one was to examine the contractility of the sphincter ani, which shows their keen observation of a well-known modern medical fact.

According to the Memoirs of Amelot de la Houssaye, Cardinal Espinola, Prime Minister to Philip II., put his hand to the embalmer's knife with which he was about to be opened. It is said that Vesalius, sometimes called the "Father of Anatomy," having been sent for to perform an autopsy on a woman subject to hysteric convulsions, and who was supposed to be dead, on making the first incision perceived by her motion and cries that she was still alive. This circumstance, becoming known, rendered him so odious that he had to leave the community in which he practised, and it is believed that he never entirely recovered from the shock it gave him. The Abbé Prévost, so well known by his works and the singularities of his life, was seized by apoplexy in the Forest of Chantilly on October 23, 1763. His body was carried to the nearest village, and the officers of justice proceeded to open it, when a cry he sent forth frightened all the assistants and convinced the surgeon in charge that the Abbé was not dead; but it was too late to save him, as he had already received a mortal wound.

Massien speaks of a woman living in Cologne in 1571 who was interred living, but was not awakened from her lethargy until a grave-digger opened her grave to steal a valuable ring which she wore. This instance has been cited in nearly every language. There is another more recent instance, coming from Poitiers, of the wife of a goldsmith named Mernache who was buried with all her jewels. During the night a beggar attempted to steal her jewelry, and made such exertion in extracting one ring that the woman recovered and was saved. After this resurrection she is said to have had several children. This case is also often quoted. Zacchias [830] mentions an instance which, from all appearances, is authentic. It was that of a young man, pest-stricken and thought to be dead, who was placed with the other dead for burial. He exhibited signs of life, and was taken back to the pest-hospital. Two days later he entered a lethargic condition simulating death, and was again on his way to the sepulcher, when he once more recovered.

It is said that when the body of William, Earl of Pembroke,[a] who died April 10, 1630, was opened to be embalmed, the hand raised when the first incision was made. There is a story of an occurrence which happened on a return voyage from India.[b] The wife of one of the passengers, an officer in the army, to all appearances died. They were about to resort to sea-burial, when, through the interposition of the husband, who was anxious to take her home, the ship-carpenters started to construct a coffin suitable for a long voyage, a process which took several days, during which time she lay in her berth, swathed in robes and ready for interment. When the coffin was at last ready the husband went to take his last farewell, and removed the wed-

[a] 536, 1887, i., 586. [b] 548, 1866, i., 287.

ding-ring, which was quite tightly on her finger. In the effort to do this she was aroused, recovered, and arrived in England perfectly well.

It is said that when a daughter of Henry Laurens, the first President of the American Congress, died of small-pox, she was laid out as dead, and the windows of the room were opened for ventilation. While left alone in this manner she recovered. This circumstance so impressed her illustrious father that he left explicit directions that in case of his death he should be burned.[a] The same journal also contains the case of a maid-servant who recovered thrice on her way to the grave, and who, when really dead, was kept a preposterous length of time before burial.

The literature on this subject is very exhaustive, volumes having been written on the uncertainty of the signs of death, with hundreds of examples cited illustrative of the danger of premature interment. The foregoing instances have been given as indicative of the general style of narration; for further information the reader is referred to the plethora of material on this subject.

Postmortem Anomalies.—Among the older writers startling **movements of a corpse** have given rise to much discussion, and possibly often led to suspicion of premature burial. Bartholinus[190] describes motion in a cadaver. Barlow[b] says that movements were noticed after death in the victims of Asiatic cholera. The bodies were cold and expressions were death-like, but there were movements simulating natural life. The most common was flexion of the right leg, which would also be drawn up toward the body and resting on the left leg. In some cases the hand was moved, and in one or two instances a substance was grasped as if by reflex action. Some observers have stated that reflex movements of the face were quite noticeable. These movements continued sometimes for upward of an hour, occurring mostly in muscular subjects who died very suddenly, and in whom the muscular irritability or nervous stimulus or both had not become exhausted at the moment of dissolution. Richardson[173] doubts the existence of postmortem movements of respiration.

Snow is accredited[c] with having seen a girl in Soho who, dying of scarlet fever, turned dark at the moment of death, but in a few hours presented such **a life-like appearance and color** as to almost denote the return of life. The center of the cheeks became colored in a natural fashion, and the rest of the body resumed the natural flesh color. The parents refused to believe that death had ensued. Richardson remarks that he had seen two similar cases, and states that he believes the change is due to oxidation of the blood surcharged with carbon dioxid. The moist tissues suffuse carbonized blood, and there occurs an osmotic interchange between the carbon dioxid and the oxygen of the air resulting in an oxygenation of the blood, and modification of the color from dark venous to arterial red.

[a] 548, 1866, i., 267. [b] 173, 1869, 5. [c] Richardson, 173, 1869.

A peculiar postmortem anomaly is **erection of the penis.** The Ephemerides and Morgagni[576] discuss postmortem erection, and Guyon mentions that on one occasion he saw 14 negroes hanged, and states that at the moment of suspension erection of the penis occurred in each; in nine of these blacks traces of this erectile state were perceived an hour after death.

Cadaveric perspiration has been observed and described by several authors, and Paullini[620] has stated that he has seen tears flow from the eyes of a corpse.

The retardation of putrefaction of the body after death sometimes presents interesting changes. **Petrifaction or mummification** of the body are quite well known, and not being in the province of this work, will be referred to collateral books on this subject; but sometimes an unaccountable preservation takes place. In a tomb recently opened at Canterbury Cathedral,[a] for the purpose of discovering what Archbishop's body it contained, the corpse was of an extremely offensive and sickening odor, unmistakably that of putrefaction. The body was that of Hubert Walter, who died in 1204 A. D., and the decomposition had been retarded, and was actually still in progress, several hundred years after burial.

Retardation of the putrefactive process has been noticed in bodies some years **under water.** König of Hermannstadt mentions a man who, forty years previous to the time of report, had fallen under the waters of Echoschacht, and who was found in a complete state of preservation.

Postmortem Growth of Hair and Nails.—The hair and beard may grow after death, and even change color. Bartholinus recalls a case of a man who had short, black hair and beard at the time of interment, but who, some time after death, was found to possess long and yellowish hair. Aristotle discusses postmortem growth of the hair, and Garmanus cites an instance in which the beard and hair were cut several times from the cadaver. We occasionally see evidences of this in the dissecting-rooms. Caldwell[b] mentions a body buried four years, the hair from which protruded at the points where the joints of the coffin had given away. The hair of the head measured 18 inches, that of the beard eight inches, and that on the breast from four to six inches. Rosse of Washington mentions an instance in which after burial the hair turned from dark brown to red, and also cites a case in a Washington cemetery of a girl, twelve or thirteen years old, who when exhumed was found to have a new growth of hair all over her body. The Ephemerides contains an account of hair suddenly turning gray after death.

Nails sometimes grow several inches after death, and there is on record the account of an idiot who had an idiosyncrasy for long nails, and after death the nails were found to have grown to such an extent that they curled up under the palms and soles.

The untoward effects of the emotions on the vital functions are

[a] 476, 1890, i., 1105. [b] 538, 1877.

quite well exemplified in medical literature. There is an abundance of cases reported in which joy, fear, pride, and grief have produced a fatal issue. In history we have the old story of the Lacedemonian woman who for some time had believed her son was dead, and who from the sudden joy occasioned by seeing him alive, herself fell lifeless. There is a similar instance in Roman history. Aristotle, Pliny, Livy, Cicero, and others cite instances of death from sudden or excessive joy. Fouquet died of excessive joy on being released from prison. A niece of the celebrated Leibnitz immediately fell dead on seeing a casket of gold left to her by her deceased uncle.

Galen mentions **death from joy**, and in comment upon it he says that the emotion of joy is much more dangerous than that of anger. In discussing this subject, Haller says that the blood is probably sent with such violence to the brain as to cause apoplexy. There is one case on record in which after a death from sudden joy the pericardium was found full of blood.[a] The Ephemerides, Marcellus Donatus,[206] Martini, and Struthius all mention death from joy.

Death from violent laughter has been recorded, but in this instance it is very probable that death was not due to the emotion itself, but to the extreme convulsion and exertion used in the laughter. The Ephemerides mentions a death from laughter, and also describes the death of a pregnant woman from violent mirth. Roy,[b] Swinger,[c] and Camerarius[247] have recorded instances of death from laughter. Strange as it may seem, Saint-Foix[d] says that the Moravian brothers, a sect of Anabaptists having great horror of bloodshed, executed their condemned brethren by tickling them to death.

Powerfully depressing emotions, which are called by Kant "asthenic," such as **great and sudden sorrow**, grief, or fright, have a pronounced effect on the vital functions, at times even **causing death**. Throughout literature and history we have examples of this anomaly. In Shakespeare's "Pericles," Thaisa, the daughter to Simonides and wife of Pericles, frightened when pregnant by a threatened shipwreck, dies in premature childbirth.

In Scott's "Guy Mannering," Mrs. Bertram, on suddenly learning of the death of her little boy, is thrown into premature labor, followed by death. Various theories are advanced in explanation of this anomaly. A very plausible one is, that the cardiac palsy is caused by energetic and persistent excitement of the inhibitory cardiac nerves. Strand[e] is accredited with saying that agony of the mind produces rupture of the heart. It is quite common to hear the expression, "Died of a broken heart;" and, strange to say, in some cases postmortem examination has proved the actual truth of the saying. Bartholinus, Fabricius Hildanus, Pliny, Rhodius, Schenck, Marcellus Donatus, Riedlin, and Garengeot speak of death from fright and fear, and the

[a] "Anecdotes de Médecine," 117.
[b] 462, 1812, Oct., 199.
[c] "Theatre vitæ human," 2656.
[d] "Essais historiques sur Paris," T. v., 54.
[e] "Treatise on the Physical Cause of the Death of Christ."

Ephemerides describes a death the direct cause of which was intense shame. Deleau,[a] a celebrated doctor of Paris, while embracing his favorite daughter, who was in the last throes of consumption, was so overcome by intense grief that he fell over her corpse and died, and both were buried together.

The **fear of child-birth** has been frequently cited as a cause of death. McClintock quotes a case from Travers of a young lady, happily married, who entertained a fear of death in child-birth; although she had been safely delivered, she suddenly and without apparent cause died in six hours. Every region of the body was examined with minutest care by an eminent physician, but no signs indicative of the cause of death were found. Mordret cites a similar instance of death from fear of labor. Morgagni[576] mentions a woman who died from the disappointment of bearing a girl baby when she was extremely desirous of a boy.

The following case, quoted from Lauder Brunton,[b] shows the extent of shock which may be produced by fear: Many years ago a janitor of a college had rendered himself obnoxious to the students, and they determined to punish him. Accordingly they prepared a block and an axe, which they conveyed to a lonely place, and having appropriately dressed themselves, some of them prepared to act as judges, and sent others of their company to bring him before them. He first affected to treat the whole affair as a joke, but was solemnly assured by the students that they meant it in real earnest. He was told to prepare for immediate death. The trembling janitor looked all around in the vain hope of seeing some indication that nothing was really meant, but stern looks met him everywhere. He was blindfolded, and made to kneel before the block. The executioner's axe was raised, but, instead of the sharp edge, a wet towel was brought sharply down on the back of the neck. The bandage was now removed from the culprit's eyes, but to the horror and astonishment of the students they found that he was dead. Such a case may be due to heart-failure from fear or excitement.

It is not uncommon that **death ensues from the shock alone following blows that cause no visible injury,** but administered to vital parts. This is particularly true of blows about the external genital region, or epigastrium, where the solar plexus is an active factor in inhibition. Ivanhoff of Bulgaria in 1886 speaks of a man of forty-five who was dealt a blow on the testicle in a violent street fight, and staggering, he fell insensible. Despite vigorous medical efforts he never regained consciousness and died in forty-five minutes. Postmortem examination revealed everything normal, and death must have been caused by syncope following violent pain. Watkins[c] cites an instance occurring in South Africa. A native shearing sheep for a farmer provoked his master's ire by calling him by some nickname. While the man was in a squatting posture the farmer struck him in the epigastrium. He followed this up by a kick in the side and a blow on the head, neither of

[a] 224, 1878, ii., 381. [b] 846, 292. [c] 476, 1884, i., 916.

which, however, was as severe as the first blow. The man fell unconscious and died. At the autopsy there were no signs indicative of death, which must have been due to the shock following the blow on the epigastrium.

As illustrative of the sensitiveness of the epigastric region, Vincent relates the following case: "A man received a blow by a stick upon the epigastrium. He had an anxious expression and suffered from oppression. Irregular heart-action and shivering were symptoms that gradually disappeared during the day. In the evening his appetite returned and he felt well; during the night he died without a struggle, and at the autopsy there was absolutely nothing abnormal to be found." Blows upon the neck often produce sudden collapse. Prize-fighters are well aware of the effects of a blow on the jugular vein. Maschka, quoted by Warren,[846] reports the case of a boy of twelve, who was struck on the anterior portion of the larynx by a stone. He fell lifeless to the ground, and at autopsy no local lesion was found nor any lesion elsewhere. The sudden death may be attributed in this case partly to shock and partly to cerebral anemia.

Soldiers have been seen to drop lifeless on the battle-field without apparent injury or organic derangement; in the olden times this death was attributed to fear and fright, and later was supposed to be caused by what is called "the wind of a cannon-ball." Tolifree[a] has written an article on this cause of sudden death and others have discussed it. By some it is maintained that the momentum acquired by a cannon-ball generates enough force in the neighboring air to prostrate a person in the immediate vicinity of its path of flight.

[a] 187, 1834, ii., 151.

CHAPTER X.

SURGICAL ANOMALIES OF THE HEAD AND NECK.

Injuries of such a delicate organ as **the eye,** in which the slightest accident can produce such disastrous consequences, naturally elicit the interest of all. Examples of **exophthalmos,** or protrusion of the eye from the orbit from bizarre causes, are of particular interest. Among the older writers we find Ficker[a] and the Ephemerides giving instances of exophthalmos from vomiting. Fabricius Hildanus[b] mentions a similar instance. Salmuth,[706] Verduc,[799] and others mention extrusion of the eyeball from the socket, due to excessive coughing. Ab Heers[409] and Sennert[732] mention instances in which after replacement the sight was uninjured. Tyler relates the case of a man who, after arising in the morning, blew his nose violently, and to his horror his left eye extruded from the orbit. With the assistance of his wife it was immediately replaced and a bandage placed over it. When Tyler saw him the upper lid was slightly swollen and discolored, but there was no hemorrhage.

Hutchinson[c] describes extrusion of the eyeball from the orbit caused by a thrust with a stick. There was paraphymotic strangulation of the globe, entirely preventing replacement and necessitating excision. Reyssie[d] speaks of a patient who, during a fire, was struck in the right eye by a stream of water from a hose, violently thrusting the eye backward. Contracting under the double influence of shock and cold, the surrounding tissues forced the eyeball from the orbit, and an hour later Reyssie saw the patient with the eye hanging by the optic nerve and muscles. Its reduction was easy, and after some minor treatment vision was perfectly restored in the injured organ. Thirty months after the accident the patient had perfect vision, and the eye had never in the slightest way discommoded him.

Bodkin[e] mentions the case of a woman of sixty who fell on the key in a door and completely avulsed her eye. In von Graefe's Archiv there is a record of a man of seventy-five who suffered complete avulsion of the eye by a cart-wheel passing over his head. Verhaeghe records[f] complete avulsion of the eye caused by a man falling against the ring of a sharp-worn key. Hamill[g]

[a] 452, 1809, xi., 63. [b] 334, cent. i., obs. i. [c] 693, 1866.
[d] 363, 1859, No. 65. [e] 312, 1854. [f] 145, xxvi., 99. [g] 224, 1878, i., 894.

describes the case of a young girl whose conjunctiva was pierced by one of the rests of an ordinary gas-bracket. Being hooked at one of its extremities the iron became entangled in either the inferior oblique or external rectus muscles, and completely avulsed the eyeball upon the cheek. The real damage could not be estimated, as the patient never returned after the muscle was clipped off close to its conjunctival insertion. Calhoun [a] mentions an instance of a little Esquimaux dog whose head was seized between the jaws of a large Newfoundland with such force as to press the left eyeball from the socket. The ball rested on the cheek, held by the taut optic nerve; the cornea was opaque. The ball was carefully and gently replaced, and sight soon returned to the eye.

In former days there was an old-fashioned manner of fighting called "gouging." In this brutal contest the combatant was successful who could, with his thumb, press his opponent's eyeball out. Strange to say, little serious or permanently bad results followed such inhuman treatment of the eye. Von Langenbeck of Berlin mentions an instance of fracture of the superior maxilla, in which the eyeball was so much displaced as to lodge in the antrum of Highmore. Von Becker of Heidelberg reports the history of a case in which a blow from the horn of a cow dislocated the eye so far back in the orbit as to present the appearance of enucleation. The conjunctiva hid the organ from view, but when it was pulled aside the eyeball was exposed, and in its remote position still possessed the power of vision. In some cases in which exophthalmos has been seemingly spontaneous, extreme laxity of the lids may serve as an explanation. There is an instance on record in which a Polish Jew appeared in a Continental hospital, saying that while turning in bed, without any apparent cause, his eyeball was completely extruded. There have been people who prided themselves on their ability to produce partial exophthalmos.

Rupture of the Eyeball.—Jessop mentions the case of a child of eight who suffered a blow on the eye from a fall against a bedpost, followed by compound rupture of the organ. The wound in the sclerotic was three or four lines in length, and the rent in the conjunctiva was so large that it required three sutures. The chief interest in this case was the rapid and complete recovery of vision.

Adler [b] reports a case of fracture of the superior maxillary in which the dislocated bone-fragment of the lower orbital border, through pressure on the inferior maxillary and counter pressure on the skull, caused rupture of the conjunctiva of the left eye.

Serious Sequelæ of Orbital Injuries.—In some instances injuries primarily to the orbit either by extension or implication of the cerebral contents provoke the most serious issues. Pointed instruments thrust into the orbital cavity may by this route reach the brain. There is a record [c] of death

[a] 176, 1876. [b] Wien. Med. Woch., No. 6, 1895. [c] 476,

caused by a wound of a cavernous sinus through the orbit by the stem of a tobacco-pipe. Bower[a] saw a woman at the Gloucester Infirmary who had been stabbed in the eye by the end of an umbrella. There was profuse hemorrhage from the nostrils and left eye, but no signs indicative of its origin. Death shortly ensued, and at the necropsy a fracture through the roof of the orbit was revealed, the umbrella point having completely severed the optic nerve and divided the ophthalmic artery. The internal carotid artery was wounded in one-half of its circumference at its bend, just before it passes up between the anterior clinoid process and the optic nerve. The cavernous sinus was also opened. In this rare injury, although there was a considerable quantity of clotted blood at the base of the brain, there was no wound to the eyeball nor to the brain itself.

Pepper records a case in which a knife was thrust through the sphenoidal fissure, wounding a large meningeal vein, causing death from intracranial hemorrhage. Nélaton describes an instance in which the point of an umbrella wounded the cavernous sinus and internal carotid artery of the opposite side, causing the formation of an arteriovenous aneurysm which ultimately burst, and death ensued. Polaillon[b] saw a boy of eighteen who was found in a state of coma. It was stated that an umbrella stick had been thrust up through the roof of the orbit and had been withdrawn with much difficulty. The anterior lobe of the brain was evidently much wounded; an incision was made in the forehead and a portion of the frontal bone chiseled away; entrance being thus effected, the dura was incised, and some blood and cerebro-spinal fluid escaped. Five splinters were removed and a portion of the damaged brain-substance, and a small artery was tied with catgut. The debris of the eyeball was enucleated and a drain was placed in the frontal wound, coming out through the orbit. The patient soon regained consciousness and experienced no bad symptoms afterward. The drains were gradually withdrawn, the process of healing advanced rapidly, and recovery soon ensued.

Annandale[c] mentions an instance in which a knitting-needle penetrated the brain through the orbit. Hewett[d] speaks of perforation of the roof of the orbit and injury to the brain by a lead-pencil.

Gunshot Injuries of the Orbit.—Barkan[e] recites the case in which a leaden ball $\frac{22}{100}$ inch in diameter was thrown from a sling into the left orbital cavity, penetrating between the eyeball and osseous wall of the orbit without rupturing the tunics of the eye or breaking the bony wall of the cavity. It remained lodged two weeks without causing any pain or symptoms, and subsequently worked itself forward, contained in a perfect conjunctival sac, in which it was freely movable.

Buchanan[f] recites the case of a private in the army who was shot at a

[a] 476, 1879, i., 547. [b] 233, Aug., 1891. [c] 318, 1877, xii.
[d] 779, 1848-50, i., 188. [e] 616, 1874-5, 444. [f] 545, 1862-3, ix., 274.

distance of three feet away, the ball entering the inner canthus of the right eye and lodging under the skin of the opposite side. The eye was not lost, and opacity of the lower part of the cornea alone resulted. Cold water and purging constituted the treatment.

It is said [a] that an old soldier of one of Napoleon's armies had a musket-ball removed from his left orbit after twenty-four years' lodgment. He was struck in the orbit by a musket-ball, but as at the same time a companion fell dead at his side he inferred that the bullet rebounded from his orbit and killed his comrade. For twenty-four years he had suffered from cephalalgia and pains and partial exophthalmos of the left eye. After removal of the ball the eye partially atrophied.

Warren reports a case of a man of thirty-five whose eyeball was destroyed by the explosion of a gun, the breech-pin flying off and penetrating the head. The orbit was crushed; fourteen months afterward the man complained of soreness on the hard palate, and the whole breech-pin, with screw attached, was extracted. The removal of the pin was followed by fissure of the hard palate, which, however, was relieved by operation. The following is an extract [b] of a report by Wenyon of Fatshan, South China :—

"Tang Shan, Chinese farmer, thirty-one years of age, was injured in the face by the bursting of a shot-gun. After being for upward of two months under the treatment of native practitioners, he came to me on December 4, 1891. I observed a cicatrix on the right side of his nose, and above this a sinus, still unhealed, the orifice of which involved the inner canthus of the right eye, and extended downward and inward for about a centimeter. The sight of the right eye was entirely lost, and the anterior surface of the globe was so uniformly red that the cornea could hardly be distinguished from the surrounding conjunctiva. There was no perceptible enlargement or protrusion of the eyeball, and it did not appear to have sustained any mechanical injury or loss of tissue. The ophthalmia and keratitis were possibly caused by the irritating substances applied to the wound by the Chinese doctors. The sinus on the side of the nose gave exit to a continuous discharge of slightly putrid pus, and the patient complained of continuous headache and occasional dizziness, which interfered with his work. The pain was referred to the right frontal and temporal regions, and the skin on this part of the head had a slight blush, but there was no superficial tenderness. The patient had been told by his native doctors, and he believed it himself, that there was no foreign body in the wound; but on probing it I easily recognized the lower edge of a hard metallic substance at a depth of about one inch posteriorly from the orifice of the sinus. Being unable to obtain any reliable information as to the probable size or shape of the object, I cautiously made several attempts to remove it through a slightly enlarged opening, but without success. I therefore continued the incision along the side of the nose to the nostril,

[a] 222, 1846. [b] 224, Oct. 12, 1895.

thus laying open the right nasal cavity; then, seizing the foreign body with a pair of strong forceps, I with difficulty removed the complete breech-pin of a Chinese gun. Its size and shape are accurately represented by the accompanying drawing (Fig. 190). The breech-pin measures a little over three inches in length, and weighs 2⅔ ounces, or 75.6 grams. It had evidently lain at the back of the orbit, inclined upward and slightly backward from its point of entrance, at an angle of about 45 degrees. On its removal the headache was at once relieved and did not return. In ten days the wound was perfectly healed and the patient went back to his work. A somewhat similar case, but which terminated fatally, is recorded in the American Journal of the Medical Sciences of July, 1882."

The extent of permanent injury done by **foreign bodies in the orbit** is variable. In some instances the most extensive wound is followed by the happiest result, while in others vision is entirely destroyed by a minor injury.

Carter[a] reports a case in which a hat-peg $3\frac{3}{10}$ inches long and about ¼ inch in diameter (upon one end of which was a knob nearly ½ inch in diameter) was impacted in the orbit for from ten to twenty days, and during this

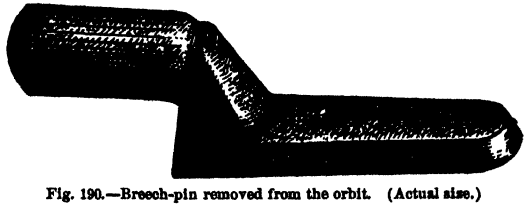


Fig. 190.—Breech-pin removed from the orbit. (Actual size.)

time the patient was not aware of the fact. Recovery followed its extraction, the vision and movements of the eye being unimpaired.

According to the Philosophical Transactions[b] a laborer thrust a long lath with great violence into the inner canthus of the left eye of his fellow workman, Edward Roberts. The lath broke off short, leaving a piece two inches long, ½ inch wide, and ¼ inch thick, in situ. Roberts rode about a mile to the surgery of Mr. Justinian Morse, who extracted it with much difficulty; recovery followed, together with restoration of the sight and muscular action. The lath was supposed to have passed behind the eyeball. Collette[c] speaks of an instance in which 186 pieces of glass were extracted from the left orbit, the whole mass weighing 186 Belgian grains. They were blown in by a gust of wind that broke a pane of glass; after extraction no affection of the brain or eye occurred. Watson[d] speaks of a case in which a chip of steel ⅜ inch long was imbedded in cellular tissue of the orbit for four days, and was removed without injury to the eye. Wordsworth[e] reports a case in which a foreign body was deeply imbedded in the orbit for six weeks, and was re-

[a] Ophth. Rev., No. 4, p. 337. [b] 629, 1743, 945. [c] 145, 1850, 217.
[d] 224, 1876, i., 506. [e] 548, 1861, ii., 452.

moved with subsequent recovery. Chisholm[a] has seen a case in which for five weeks a fly was imbedded in the culdesac between the lower lid and the eyeball.

Foreign bodies are sometimes contained **in the eyeball** for many years. There is an instance on record[b] in which a wooden splinter, five mm. long and two mm. broad, remained in the eye forty-seven years. It was extracted, with the lens in which it was lodged, to relieve pain and other distressing symptoms. Snell[c] reports a case in which a piece of steel was imbedded and encapsulated in the ciliary process twenty-nine years without producing sympathetic irritation of its fellow, but causing such pain as to warrant enucleation of this eye. Gunning[d] speaks of a piece of thorn ⅝ inch long, imbedded in the left eyeball of an old man for six years, causing total loss of vision; he adds that, after its removal, some improvement was noticed.

Williams mentions a stone-cutter whose left eye was put out by a piece of stone. Shortly after this his right eye was wounded by a knife, causing traumatic cataract, which was extracted by Sir William Wilde, giving the man good sight for twelve years, after which iritis attacked the right eye and produced a false membrane over the pupil so that the man could not work. It was in this condition that he consulted Williams, fourteen years after the loss of the left eye. The eye was atrophied, and on examination a piece of stone was seen projecting from it directly between the lids. The visible portion was ¼ inch long, and the end in the shrunken eye was evidently longer than the end protruding. The sclera was incised, and, after fourteen years' duration in the eye, the stone was removed.

Taylor[e] reports the removal of a piece of bone which had remained quiescent in the eye for fourteen years; after the removal of the eye the bone was found adherent to the inner tunics. It resembled the lens in size and shape. Williams[f] mentions continual tolerance of foreign bodies in the eyeball for fifteen and twenty-two years; and Chisholm[g] reports the lodgment of a fragment of metal in the iris for twenty-three years. Liebreich[h] extracted a piece of steel from the interior of the eye where it had been lodged twenty-two years. Barkar[i] speaks of a piece of steel which penetrated through the cornea and lens, and which, five months later, was successfully removed by the extraction of the cataractous lens. Critchett[j] gives an instance of a foreign body being loose in the anterior chamber for sixteen years. Rider[k] speaks of the lodgment of a fragment of a copper percussion cap in the left eye, back of the inner ciliary margin of the iris, for thirty-five years; and Bartholinus[l] mentions a thorn in the canthus for thirty years. Jacob[m] reports a case in which a chip of iron remained in the eyeball twenty-eight years

[a] 186, 1870. [b] 548, 1880, i., 280. [c] 476, 1880, i., 749. [d] 476, 1880, i., 749.
[e] 809, 1878. [f] 218, 1881, 84. [g] 476, April 3, 1880. [h] 224, 1873, ii., 651.
[i] Archiv. of Opthal. and Otol., N. Y., 1874, iv., 231. [j] 693, 1857–8, i., 264.
[k] 773, 1872, 160. [l] 188, iv., obs. 64. [m] 476, 1880, i., 667.

without giving indications for removal. It was clearly visible, protruding into the anterior surface of the iris, and although it was rusted by its long lodgment, sight in the eye was fairly good, and there was no sign of irritation.

Snell[a] gives an instance in which a piece of steel was imbedded close to the optic disc with retention of sight. It was plainly visible by the opthalmoscope eighteen months after the accident, when as yet no diminution of sight was apparent. Smyly[b] speaks of a portion of a tobacco pipe which was successfully removed from the anterior chamber by an incision through the cornea. Clark[c] mentions a case in which molten lead in the eye caused no permanent injury; and there are several cases mentioned in confirmation of the statement that the eye seems to be remarkably free from disastrous effects after this injury.

Williamson[d] mentions eyelashes in the anterior chamber of the eye, the result of a stab wound of this organ.

Contusion of the eyeball may cause **dislocation of the lens** into the anterior chamber, and several instances have been recorded. We regret our inability to give the reference or authority for a report that we have seen, stating that by one kick of a horse the lenses of both eyes of a man were synchronously knocked through the eyeballs by the calkins of the horseshoe. Oliver mentions extraction of a lens by a thrust of a cow's horn.

Lowe[e] speaks of rupture of the anterior capsule of the lens from violent sneezing, with subsequent absorption of the lenticular substance and restoration of vision. Trioen[f] mentions a curious case of expulsion of the crystalline lens from the eye in ophthalmia, through the formation of a corneal fissure. The authors have personal knowledge of a case of spontaneous extrusion of the lens through a corneal ulcer, in a case of ophthalmia of the new-born.

Injury of the Eyeball by Birds.—There are several instances in which birds have pierced the eyeball with their bills, completely destroying vision. Not long since a prominent taxidermist winged a crane, picked it up, and started to examine it, when it made one thrust with its bill and totally destroyed his eyeball. In another instance a man was going from the railroad station to his hotel in a gale of wind, when, as he turned the corner of the street, an English sparrow was blown into his face. Its bill penetrated his eyeball and completely ruined his sight. There are several instances on record in which game fowls have destroyed the eyes of their owners. In one case a game cock almost completed the enucleation of the eye of his handler, by striking him with his gaff while preparing in a cock-pit.

Moorehead[g] explains a **rare accident** to an eye as follows:—

"Mr. S. B. A., while attending to his bees, was stung by one upon the right upper eyelid near its center. An employee, who was assisting in the work, immediately discovered the sting driven in the lid and cautiously ex-

[a] 693, ix., part iii. [b] 310, 1876, 181. [c] 591, 1852, 302.
[d] 476, 1882, ii., 448. [e] 476, 1861, i., 530. [f] 784, 98. [g] 533, May 27, 1893.

tracted it, stating that he made sufficient traction to lift the lid well away from the globe. In a few hours the lid became much swollen, but the pain experienced at first had disappeared. Before retiring for the night he began gentle massage of the lid, stroking it horizontally with his finger. The edematous condition was by this means much reduced in a short time. While thus engaged in stroking the lid he suddenly experienced intense pain in the eye as if it had been pierced by a sharp instrument. The suffering was very severe, and he passed a wretched night, constantly feeling 'something in his eye.'

"The next morning, the trouble continuing, he came to me for relief. Upon examination of the lid, no opening could be made out where the sting had penetrated, and a minute inspection of the conjunctival surface with a good glass failed to reveal any foreign substance. Cleansing the lid thoroughly, and carefully inspecting with a lens under strong light, a minute dark point was made out about the center of the lid. Feeling that this might be the point of the sting, I had recourse to several expedients for its removal, but without success. Finally, with a fine knife, I succeeded in cutting down by the side of the body and tilting it out. Examination with a $\frac{1}{8}$ inch objective confirmed my opinion that it was the point of the bee-sting.

"The barbed formation of the point explains how, under the stroking with the finger, it was forced through the dense tarsal cartilage and against the cornea of the eye."

There is a story told in La Médecine Moderne[a] of a seamstress of Berlin who was in the habit of allowing her dog to lick her face. She was attacked with a severe inflammation of the right eye, which had to be enucleated, and was found full of tenia echinococcus, evidently derived from the dog's tongue.

Gabb[b] mentions a case of epistaxis in which the blood welled up through the lacrimal ducts and suffused into the eye so that it was constantly necessary to wipe the lower eyelid, and the discharge ceased only when the nose stopped bleeding. A brief editorial note on **epistaxis through the eyes,** referring to a case in the Medical News of November 30, 1895, provoked further reports from numerous correspondents. Among others, the following:—

"Dr. T. L. Wilson of Bellwood, Pa., relates the case of an old lady of seventy-eight whom he found with the blood gushing from the nostrils. After plugging the nares thoroughly with absorbent cotton dusted with tannic acid he was surprised to see the blood ooze out around the eyelids and trickle down the cheeks. This oozing continued for the greater part of an hour, being controlled by applications of ice to both sides of the nose."

"Dr. F. L. Donlon of New York City reports the case of a married woman, about fifty years old, in whom epistaxis set in suddenly at 11 P. M., and had continued for several hours, when the anterior nares were plugged.

[a] 545, June 6, 1896. [b] 224, 1883, i., 715.

In a short time the woman complained that she could scarcely see, owing to the welling up of blood in the eyes and trickling down her face. The bleeding only ceased when the posterior nares also were plugged."

"Dr. T. G. Wright of Plainville, Conn., narrates the case of a young man whom he found in the night, bleeding profusely, and having already lost a large amount of blood. Shortly after plugging both anterior and posterior nares the blood found its way through the lacrimal ducts to the eyes and trickled down the cheeks."

"Dr. Charles W. Crumb cites the case of a man, sixty-five years old, with chronic nephritis, in whom a slight bruise of the nose was followed by epistaxis lasting twenty-four hours. When the nares were plugged blood escaped freely from the eyes. A cone-shaped bit of sponge, saturated with ferrous sulphate, was passed into each anterior naris, and another piece of sponge, similarly medicated, into either posterior naris. The patient had been taking various preparations of potassium, and it was thought that his blood contained a deficiency of fibrin. Upon removal of the nasal plugs a catarrhal inflammation developed which lasted a long time and was attended with considerable purulent discharge."

Late Restoration of Sight.—There are some marvelous cases on record in which, after many years of blindness, the surgeon has been able, by operation, to restore the sight. McKeown[a] gives the history of a blind fiddler of sixty-three, who, when one and a half years old, had lost the sight of both eyes after an attack of small-pox. Iridectomy was performed, and after over sixty years of total blindness his sight was restored; color-perception was good. Berncastle[b] mentions a case of extraction of double cataract and double iridectomy for occluded pupils, which, after thirty years of blindness, resulted in the recovery of good sight. The patient was a blind beggar of Sydney.

To those interested in this subject, Jauffret[c] has a most interesting description of a man by the name of Garin, who was born blind, who talked at eight or nine months, showed great intelligence, and who was educated at a blind asylum. At the age of twenty-four he entered the hospital of Forlenze, to be operated upon by that famous oculist. Garin had never seen, but could distinguish night or darkness by one eye only, and recognized orange and red when placed close to that eye. He could tell at once the sex and age of a person approximately by the voice and tread, and formed his conclusions more rapidly in regard to females than males. Forlenze diagnosed cataract, and, in the presence of a distinguished gathering, operated with the happiest result. The description that follows, which is quoted by Fournier[d] and is readily accessible to any one, is well worth reading, as it contains an account of the first sensations of light, objects, distance, etc., and minor analogous

[a] 476, 1888, i., 14. [b] 179, Oct. 15, 1869.

[c] "Experience metaphysique ou Developpement de la lumière et des sensations."

[d] 302, iv.

thoughts, of an educated and matured mind experiencing its first sensations of sight.

Hansell and Clark [848] say that the perplexities of learning to see after twenty-six years of blindness from congenital disease, as described by a patient of Franke, remind one of the experience of Shelley's Frankenstein. Franke's patient was successfully operated on for congenital double cataract, at twenty-six years of age. The author describes [a] the difficulties the patient had of recognizing by means of vision the objects he had hitherto known through his other senses, and his slowness in learning to estimate distances and the comparative size of objects.

Sight is popularly supposed to be occasionally **restored without the aid of art,** after long years of blindness. Benjamin Rush saw a man of forty-five who, twelve years before, became blind without ascertainable cause, and recovered his sight equally without reason. St. Clair mentions Marshal Vivian, who at the age of one hundred regained sight that for nearly forty years had gradually been failing almost to blindness, and preserved this new sight to the time of his death.

There are many superstitions prevalent among uneducated people as to "second sight," recovery of vision, etc., which render their reports of such things untrustworthy. The real explanations of such cases are too varied for discussion here.

Nyctalopia etymologically means night-blindness, but the general usage, making the term mean night-vision, is so strongly intrenched that it is useless and confusing to attempt any reinstatement of the old significance. The condition in which one sees better by night, relatively speaking, than by day is due to some lesion of the macular region, rendering it blind. At night the pupil dilates more than in the day-time, and hence vision with the extramacular or peripheral portions of the retina is correspondingly better. It is, therefore, a symptom of serious retinal disease. All night-prowling animals have widely dilatable pupils, and in addition to this they have in the retina a special organ called the *tapetum lucidum*, the function of which is to reflect to a focus in front of them the relatively few rays of light that enter the widely-dilated pupil and thus enable them the better to see their way. Hence the luminous appearance of the eyes of such animals in the dark.

Hemeralopia (etymologically day-blindness, but by common usage meaning day-vision or night-blindness) is a symptom of a peculiar degenerative disease of the retina, called *retinitis pigmentosa*. It also occurs in some cases of extreme denutrition, numerous cases having been reported among those who make the prolonged fasts customary in the Russian church. In *retinitis pigmentosa* the peripheral or extramacular portions of the retina are subject to a pigmentary degeneration that renders them insensitive to light, and patients so afflicted are consequently incapable of seeing at night as well as others. They stumble and run against objects easily seen by the normal eye.

[a] Beit. zur Augenh., Heft xvi., 1894.

Snow-blindness occurs from prolonged exposure of the eyes to snow upon which the sun is shining. Some years ago, some seventy laborers, who were clearing away snow-drifts in the Caucasus, were seized, and thirty of them could not find their way home, so great was the photophobia, conjunctivitis, and lacrimation. Graddy [a] reports six cases, and many others are constantly occurring.

Other forms of **retinal injury from too great or too prolonged exposure to light** are "moon-blindness," due to sleeping with the eyes exposed to bright moonlight, and that due to lightning—a case, *e. g.*, being reported by Knies.[b] Silex [c] also reports such a case and reviews the reported cases, 25 in number, in ten of which cataract ensued. In the Annual of the Universal Medical Sciences, 1888, there is a report of seven cases of retinal injury with central scotoma, amblyopia, etc., in Japanese medical students, caused by observation of the sun in eclipse.

In discussing the question of **electric-light injuries of the eyes** Gould [d] reviews the literature of the subject and epitomizes the cases reported up to that time. They numbered 23. No patient was seriously or permanently injured, and none was in a person who used the electric light in a proper manner as an illuminant. All were in scientific investigators or workmen about the light, who approached it too closely or gazed at it too long and without the colored protecting spectacles now found necessary by such workers.

Injuries to the Ear.—The folly of the practice of **boxing children's ears,** and the possible disastrous results subsequent to this punishment, are well exemplified throughout medical literature. Stewart [e] quotes four cases of rupture of the tympanum from boxing the ears, and there is an instance [f] of a boy of eight, who was boxed on the ear at school, in whom subsequent brain-disease developed early, and death followed. Roosa of New York mentions the **loss of hearing following a kiss on the ear.**[g]

Dalby,[h] in a paper citing many different **causes of rupture of the tympanic membrane,** mentions the following: A blow in sparring; violent sneezing; blowing the nose; forcible dilatation of the Eustachian canal; a thorn or twig of a tree accidentally thrust into the head; picking the ear with a toothpick. In time of battle soldiers sometimes have their tympanums ruptured by the concussion caused by the firing of cannon. Dalby mentions an instance of an officer who was discharged for deafness acquired in this manner during the Crimean War. He was standing beside a mortar which, unexpectedly to him, was fired, causing rupture of the tympanic membrane, followed by hemorrhage from the ear. Similar cases were reported in the recent naval engagements between the Chinese and Japanese. Wilson [i] reports two

[a] 124, 1887. [b] Graefe's Archiv, 1887. [c] Arch. f. Augenheilk., 1887.
[d] 533, Dec. 8, 1888. [e] 476, 1889, i., 574. [f] 476, 1879, i., 23.
[g] Archives of Otology, 1880, ix., 16. [h] 476, 1875, i., 752. [i] 533, xli., 173.

cases of rupture of the membrana tympani caused by diving. Roosa[a] divides the causes into traumatic, hemorrhagic, and inflammatory, and primary lesions of the labyrinth, exemplifying each by numerous instances. Under traumatic causes he mentions severe falls, blows about the head or face, constant listening to a telegraphic instrument, cannonading, and finally eight cases of boiler-makers' deafness. Roosa cites a curious case of **sudden** and profound **deafness** in a young man in perfect health, while calling upon the parents of his lady-love to ask her hand in marriage. Strange to say that after he had had a favorable reply he gradually recovered his hearing! In the same paper there is an instance of a case of deafness due to the sudden cessation of perspiration, and an instance of tinnitus due to the excessive use of tobacco; Roosa also mentions a case of deafness due to excessive mental employment.

Perforation of the Tympanum.—Kealy[b] relates an instance in which a pin was introduced into the left ear to relieve an intolerable itching. It perforated the tympanum, and before the expiration of twenty-four hours was coughed up from the throat with a small quantity of blood. The pin was bent at an angle of about 120 degrees. Another similar case[c] was that of a girl of twenty-two who, while pricking her ear with a hair-pin, was jerked or struck on the arm by a child, and the pin forced into the ear; great pain and deafness followed, together with the loss of taste on the same side of the tongue; after treatment both of the disturbed senses were restored. A man of twenty[d] was pricked in the ear by a needle entering the meatus. He uttered a cry, fell senseless, and so continued until the fourth day when he died. The whole auditory meatus was destroyed by suppuration. Gamgee[e] tells of a constable who was stabbed in the left ear, severing the middle meningeal artery, death ensuing. In this instance, after digital compression, ligature of the common carotid was practised as a last resort. There is an account[f] of a provision-dealer's agent who fell asleep at a public house at Tottenham. In sport an attendant tickled his ear with a wooden article used as a pipe light. A quick, unconscious movement forced the wooden point through the tympanum, causing cerebral inflammation and subsequent death. There is a record[g] of death, in a child of nine, caused by the passage of a knitting-needle into the auditory meatus.

Kauffmann[h] reports a case of what he calls **objective tinnitus aurium,** in which the noise originating in the patient's ears was distinctly audible by others. The patient was a boy of fourteen, who had fallen on the back of his head and had remained unconscious for nearly two weeks. The noises were bilateral, but more distinct on the left than on the right side. The sounds were described as crackling, and seemed to depend on movements of

[a] 124, Oct., 1874, 376. [b] 548, 1859, 602. [c] 476, 1889, i., 574.
[d] 566, Jan. 20, 1829. [e] 476, 1875, i., 535. [f] 476, 1895, ii., 222.
[g] 224, 1869, ii., 470. [h] Deutsche Med. Zeitung, Jan. 6, 1896.

the arch of the palate. Kauffmann expresses the opinion that the noises were due to clonic spasm of the tensor velum palati, and states that under appropriate treatment the tinnitus gradually subsided.

The introduction of **foreign bodies in the ear** is usually accidental, although in children we often find it as a result of sport or curiosity. There is an instance on record of a man who was accustomed to catch flies and put them in his ear, deriving from them a pleasurable sensation from the tickling which ensued. There have been cases in which children, and even adults, have held grasshoppers, crickets, or lady-birds to their ears in order to more attentively listen to the noise, and while in this position the insects have escaped and penetrated the auditory canal. **Insects** often enter the ears of persons reposing in the fields with the ear to the ground. Fabricius Hildanus speaks of a cricket penetrating the ear during sleep. Calhoun [a] mentions an instance of disease of the ear which he found was due to the presence of several living maggots in the interior of the ear. The patient had been sleeping in a horse stall in which were found maggots similar to those extracted from his ear. An analogous instance was seen in a negro in the Emergency Hospital, Washington, D. C., in the summer of 1894; and many others are recorded. The insects are frequently removed only after a prolonged lodgment.

D'Aguanno [b] gives an account of two instances of living larvæ of the musca sarcophaga in the ears of children. In one of the cases the larvæ entered the drum-cavity through a rupture in the tympanic membrane. In both cases the maggots were removed by forceps. Haug [c] has observed a tic (ixodes ricinus) in the ear of a lad of seventeen. The creature was killed by a mercuric-chlorid solution, and removed with a probe.

There is a common superstition that centipedes have the faculty of entering the ear and penetrating the brain, causing death. The authors have knowledge of an instance in which three small centipedes were taken from the ear of a policeman after remaining there three days; during this time they caused excruciating pain, but there was no permanent injury. The Ephemerides contains instances in which, while yet living, worms, crickets, ants, and beetles have all been taken from the ear. In one case the entrance of a cricket in the auditory canal was the cause of death. Martin [d] gives an instance in which larvæ were deposited in the ear. Stalpart van der Wiel [750] relates an instance of the lodgment of a living spider in the ear.

Far more common than insects are **inanimate objects as foreign bodies** in the ear, and numerous examples are to be found in literature. Fabricius Hildanus [834] tells of a glass ball introduced into the auditory canal of a girl of ten, followed by headache, numbness on the left side, and after four or five years epileptic seizures, and atrophy of the arm. He extracted it and the symptoms immediately ceased. Sabatier speaks of an abscess of the brain caused by a ball of paper in the ear; and it is quite common for persons in

[a] 176, 1873, x., 665. [b] 843, 836. [c] Ibid. [d] 462, T. xxxi., 179.

the habit of using a tampon of cotton in the meatus to mistake the deep entrance of this substance for functional derangement, and many cases of temporary deafness are simply due to forgetfulness of the cause. A strange case is reported in a girl of fourteen, who lost her tympanum from a profuse otorrhea, and who substituted an artificial tympanum which was, in its turn, lost by deep penetration, causing augmentation of the symptoms, of the cause of which the patient herself seemed unaware.[a] Sometimes artificial otoliths are produced by the insufflation of various powders which become agglutinated, and are veritable foreign bodies. Holman[b] tells of a negro, aged thirty-five, whose wife poured molten pewter in his ear while asleep. It was removed, but total deafness was the result.

Alley[c] mentions a New Orleans wharf laborer, in whose ear was poured some molten lead; seventeen months afterward the lead was still occupying the external auditory meatus. It is quite remarkable that the lead should have remained such a length of time without causing meningeal inflammation. There was deafness and palsy of that side of the face. A fungous growth occupied the external portion of the ear; the man suffered pain and discharge from the ear, and had also great difficulty in closing his right eyelid. Morrison[d] mentions an alcoholic patient of forty who, on June 6, 1833, had nitric acid poured in her right ear. There were no headache, febrile symptoms, stupor, or vertigo. Debility alone was present. Two weeks after the injury paralysis began on the right side, and six weeks from the injury the patient died. This case is interesting from the novel mode of death, the perfect paralysis of the arm, paralysis agitans of the body (occurring as hemorrhage from the ear came on, and subsiding with it), and extensive caries of the petrous bone, without sensation of pain or any indicative symptoms.

There is an instance in a young girl in which a piece of pencil remained in the right ear for seven years.[e] Haug speaks of two beads lying in the auditory canal for twenty-eight years without causing any harm.

A boy of six introduced a carob-nut kernel into each ear. On the next day incompetent persons attempted to extract the kernel from the left side, but only caused pain and hemorrhage. The nut issued spontaneously from the right side. In the afternoon the auditory canal was found excoriated and red, and deep in the meatus the kernel was found, covered with blood. The patient had been so excited and pained by the bungling attempts at extraction that the employment of instruments was impossible; prolonged employment of injections was substituted. Discharge from the ear commenced, intense fever and delirium ensued, and the patient had to be chloroformed to facilitate the operation of extraction. The nut, when taken out, was found to have a consistency much larger than originally, caused by the agglutination of wax and blood. Unfortunately the symptoms of meningitis increased; three days

[a] 720, 1877, 210. [b] 744, 1888. [c] 124, April, 1852, 377.
[d] 310, 1836, ix., 99. [e] 554, 1842, No. 32.

after the operation coma followed, and on the next day death ensued.[a] In 75 cases collected by Mayer, and cited by Poulet[641] (whose work on "Foreign Bodies" is the most extensive in existence), death as a consequence of meningitis was found in three.

Fleury de Clermont[b] mentions a woman of twenty-five who consulted him for removal of a pin which was in her right ear. Vain attempts by some of her lay-friends to extract the pin had only made matters worse. The pin was directed transversely, and its middle part touched the membrana tympanum. The mere touching of the pin caused the woman intense pain; even after etherization it was necessary to construct a special instrument to extract it. She suffered intense cephalalgia and other signs of meningitis; despite vigorous treatment she lost consciousness and died shortly after the operation.

Winterbotham[c] reports an instance in which a cherry-stone was removed from the meatus auditorius after lodgment of upward of sixty years. Marchal de Calvi mentions intermittent deafness for forty years, caused by the lodgment of a small foreign body in the auditory canal. There is an instance in which a carious molar tooth has been tolerated in the same location for forty years.[d]

Albucasius, Fabricius Hildanus, Paré, and others, have mentioned the fact that seeds and beans have been frequently seen to increase in volume while lodged in the auditory canal. Tulpius[842] speaks of an infant, playing with his comrades, who put a cherry-seed in his ear which he was not able to extract. The seed increased in volume to such an extent that it was only by surgical interference that it could be extracted, and then such serious consequences followed that death resulted. Albers[e] reports an instance in which a pin introduced into the ear issued from the pharynx.

Confusion of diagnosis is occasionally noticed in terrified or hysteric persons. Lowenberg was called to see a child of five who had introduced a button into his left ear. When he saw the child it complained of all the pain in the right ear, and he naturally examined this ear first but found nothing to indicate the presence of a foreign body. He examined the ear supposed to be healthy and there found the button lying against the tympanum. This was explained by the fact that the child was so pained and terrified by the previous explorations of the affected ear that rather than undergo them again he presented the well ear for examination. In the British Medical Journal for 1877 is an account of an unjustified exploration of an ear for a foreign body by an incompetent physician, who spent a half hour in exploration and manipulation, and whose efforts resulted in the extraction of several pieces of bone. The child died in one and a half hours afterward from extreme hemorrhage, and the medical bungler was compelled to appear before a coroner's jury in explanation of his ignorance.

In the external ear of a child Tansley observed a diamond which he

[a] 720, 1800, 230. [b] 363, 1870, 58. [c] 548, 1866, ii., 496. [d] 641, 695. [e] 456, i., 151.

removed under chloroform.[a] The mother of the child had pushed the body further inward in her endeavors to remove it and had wounded the canal. Schmiegelow[b] reports a foreign body forced into the drum-cavity, followed by rough extraction, great irritation, tetanus, and death; and there are on record several cases of fatal meningitis, induced by rough endeavors to extract a body from the external ear.

In the Therapeutic Gazette, August 15, 1896, there is a translation of the report of a case by Voss, in which a child of five pushed a dry pea in his ear. Four doctors spent several days endeavoring to extract it, but only succeeded in pushing it in further. It was removed by operation on the fifth day, but suppuration of the tympanic cavity caused death on the ninth day.

Barclay[c] reports a rare case of ensnared aural foreign body in a lady, aged about forty years, who, while "picking" her left ear with a so-called "invisible hair-pin" several hours before the consultation, had heard a sudden "twang" in the ear, as if the **hair-pin** had broken. And so, indeed, it had; for on the instant she had attempted to jerk it quickly from the ear the sharp extremity of the inner portion of its lower prong sprang away from its fellow, penetrated the soft tissues of the floor of the external auditory canal, and remained imbedded there, the separated end of this prong only coming away in her grasp. Every attempt on her part to remove the hair-pin by traction on its projecting prong—she durst not force it *inward* for fear of wounding the drumhead—had served but to bury the point of the broken prong more deeply into the flesh of the canal, thereby increasing her suffering. Advised by her family physician not to delay, she forthwith sought advice and aid. On examination, it was found that the lower prong of the "invisible hair-pin" had broken at the outer end of its wavy portion, and seemed firmly imbedded in the floor of the auditory canal, now quite inflamed, at a point about one-third of its depth from the outlet of the canal. The loop or turn of the hair-pin was about ½ inch from the flaccid portion of the drumhead, and, together with the unbroken prong, it lay closely against the roof of the canal. Projecting from the meatus there was enough of this prong to be easily grasped between one's thumb and finger. Removal of the hair-pin was effected by first inserting within the meatus a Gruber speculum, encircling the unbroken projecting prong, and then raising the end of the broken one with a long-shanked aural hook, when the hair-pin was readily withdrawn. The wound of the canal-floor promptly healed.

In the severest forms of **scalp-injuries,** such as avulsion of the scalp from the entangling of the hair in machinery, skin-grafting or replantation is of particular value. Ashhurst[d] reports a case which he considers the severest case of scalp-wound that he had ever seen, followed by recovery. The patient was a girl of fifteen, an operative in a cotton-mill, who was caught by

[a] 165, Aug., 1894. [b] 843, 836. [c] 533, Jan. 11, 1896. [d] 174, 324.

her hair between two rollers which were revolving in opposite directions; her scalp being thus, as it were, squeezed off from her head, forming a large horseshoe flap. The linear extent of the wound was 14 inches, the distance between the two extremities being but four inches. This large flap was thrown backward, like the lid of a box, the skull being denuded of its pericranium for the space of 2½ by one inch in extent. The anterior temporal artery was divided and bled profusely, and when admitted to the hospital the patient was extremely depressed by shock and hemorrhage. A ligature was applied to the bleeding vessel, and after it had been gently but carefully cleansed the flap was replaced and held in place with gauze and collodion dressing. A large compress soaked in warm olive oil was then placed over the scalp, covered with oiled silk and with a recurrent bandage. A considerable portion of the wound healed by adhesions, and the patient was discharged, cured, in fifty-four days. No exfoliation of bone occurred. Reverdin, a relative of the discoverer of transplantation of skin,[a] reported the case of a girl of twenty-one whose entire scalp was detached by her hair being caught in machinery, leaving a wound measuring 35 cm. from the root of the nose to the nape of the neck, 28 cm. from one ear to the other, and 57 cm. in circumference. Grafts from the rabbit and dog failed, and the skin from the amputated stump of a boy was employed, and the patient was able to leave the hospital in seven months. Cowley[b] speaks of a girl of fourteen whose hair was caught in the revolving shaft of a steam-engine, which resulted in the tearing off of her whole scalp. A triangular portion of the skin was hanging over her face, the apex of the triangle containing short hair, from which the long hair had been detached. Both ears were hanging down the neck, having been detached above. The right pinna was entire, and the upper half of the left pinna had disappeared. The whole of the head and back of the neck was denuded of skin. One of the temporal arteries was ligated, and the scalp cleansed and reapplied. The hanging ears and the skin of the forehead were successfully restored to their proper position. The patient had no bad symptoms and little pain, and the shock was slight. Where the periosteum had sloughed the bone was granulating, and at the time of the report skin-grafting was shortly to be tried.

Schaeffer[c] has presented quite an extensive article on scalp-injuries in which grafting and transplantation has been used, and besides reporting his own he mentions several other cases. One was that of a young lady of twenty-four. While at work under a revolving shaft in a laundry the wind blew her hair and it was caught in the shaft. The entire skull was laid bare from the margin of the eyelids to the neck. The nasal bones were uncovered and broken, exposing the superior nasal meatus. The skin of the eyelids was removed from within three mm. of their edges. The lower margin of the wound

[a] Deutsche Zeitschrift für Chirurg., Feb., 1876. [b] 476, 1879, ii., 421.
[c] 782, 1887, iii., 166 et seq.

was traceable from the lower portion of the left external process of the frontal bone, downward and backward below the left ear (which was entirely removed), thence across the neck, five cm. below the superior curved line of the occipital bone, and forward through the lower one-third of the right auricle to the right external angular process of the frontal bone and margin of the right upper eyelid, across the lid, nose, and left eyelid, to the point of commencement. Every vessel and nerve supplying the scalp was destroyed, and the pericranium was torn off in three places, one of the denuded spots measuring five by seven cm. and another five by six cm. The neck flap of the wound fell away from the muscular structures beneath it, exposing the trapezius muscle almost one-half the distance to the shoulder blade. The right ear was torn across in its lower third, and hung by the side of the neck by a piece of skin less than five mm. wide. The exposed surface of the wound measured 40 cm. from before back, and 34 cm. in width near the temporal portion. The cranial sutures were distinctly seen in several places, and only a few muscular fibers of the temporal were left on each side. Hemorrhage was profuse from the temporal, occipital, and posterior auricular arteries, which were tied. The patient was seen three-quarters of an hour after the injury, and the mangled scalp was thoroughly washed in warm carbolized water, and stitched back in position, after the hair was cut from the outer surface. Six weeks after the injury suppuration was still free, and skin-grafting was commenced. In all, 4800 grafts were used, the patient supplying at different times 1800 small grafts. Her own skin invariably did better than foreign grafts. In ten months she had almost completely recovered, and sight and hearing had returned. Figure 191 shows the extent of the injury, and the ultimate results of the treatment.

Schaeffer also reports the case of a woman working in a button factory at Union City, Conn., in 1871, who placed her head under a swiftly turning shaft to pick up a button, when her hair caught in the shaft, taking off her scalp from the nape of the neck to the eyebrows. The scalp was cleansed by her physician, Dr. Bartlett, and placed on her head about two hours after the accident, but it did not stay in position. Then the head was covered twice by skin-grafts, but each time the grafts were lost; but the third time a successful grafting was performed and she was enabled to work after a period of two years. The same authority also quotes Wilson and Way of Bristol, Conn., in an account of a complete avulsion of the scalp, together with tearing of the eyelid and ear. The result of the skin-grafting was not given. Powell of Chicago gives an account of a girl of nineteen who lost her scalp while working in the Elgin Watch Factory at Elgin, Illinois. The wound extended across the forehead above the eyebrows, but the ears were untouched. Skin-grafting was tried in this case but with no result, and the woman afterward lost an eye by exposure, from retraction of the eyelid.

In some cases **extensive wounds of the scalp heal without artificial**

aid by simply cicatrizing over. Gross[387] mentions such a case in a young lady, who, in 1869, lost her scalp in a factory. There is reported[a] an account of a conductor on the Union Pacific Railroad, who, near Cheyenne, in 1869, was scalped by Sioux Indians. He suffered an elliptic wound, ten by eight cm., a portion of the outer table of the cranium being removed, yet the wound healed over.

Cerebral Injuries.—The recent advances in brain-surgery have, in a measure, diminished the interest and wonder of some of the older instances of

Fig. 191.—Scalp-injury and skin-graft (Schaeffer).

major injuries of the cerebral contents with unimportant after-results, and in reviewing the older cases we must remember that the recoveries were made under the most unfavorable conditions, and without the slightest knowledge of all important asepsis and antisepsis.

Penetration or even complete **transfixion of the brain** is not always attended with serious symptoms. Dubrisay[b] is accredited with the description of a man of forty-four, who, with suicidal intent, drove a dagger ten cm. long and one cm. wide into his brain. He had deliberately held the dagger

[a] 544, surgical portion, part i., 315.

[b] 476, 1881, ii., 845.

in his left hand, and with a mallet in his right hand struck the steel several blows. When seen two hours later he claimed that he experienced no pain, and the dagger was sticking out of his head. For half an hour efforts at extraction were made, but with no avail. He was placed on the ground and held by two persons while traction was made with carpenter's pliers. This failing, he was taken to a coppersmith's, where he was fastened by rings to the ground, and strong pinchers were placed over the dagger and attached to a chain which was fastened to a cylinder revolved by steam force. At the second turn of the cylinder the dagger came out. During all the efforts at extraction the patient remained perfectly cool and complained of no pain. A few drops of blood escaped from the wound after the removal of the dagger, and in a few minutes the man walked to a hospital where he remained a few days without fever or pain. The wound healed, and he soon returned to work. By experiments on the cadaver Dubrisay found that the difficulty in extraction was due to rust on the steel, and by the serrated edges of the wound in the bone.

Warren describes a case of epilepsy of seven months' standing, from depression of the skull caused by a red hot poker thrown at the subject's head. Striking the frontal bone just above the orbit, it entered three inches into the cerebral substance. Kesteven[a] reports the history of a boy of thirteen who, while holding a fork in his hand, fell from the top of a load of straw. One of the prongs entered the head one inch behind and on a line with the lobe of the left ear and passed upward and slightly backward to almost its entire length. With some difficulty it was withdrawn by a fellow workman; the point was bent on itself to the extent of two inches. The patient lived nine days. Abel and Colman[b] have reported a case of puncture of the brain with loss of memory, of which the following extract is an epitome: "A railway-fireman, thirty-six years old, while carrying an oil-feeder in his hand, slipped and fell forward, the spout of the can being driven forcibly into his face. There was transitory loss of consciousness, followed by twitching and jerking movements of the limbs, most marked on the left side, the legs being drawn up and the body bent forward. There was no hemorrhage from mouth, nose, or ears. The metallic spout of the oil-can was firmly fixed in the base of the skull, and was only removed from the grasp of the bone by firm traction with forceps. It had passed upward and toward the middle line, with its concavity directed from the middle line. Its end was firmly plugged by bone from the base of the skull. No hemorrhage followed its removal. The wound was cleansed and a simple iodoform-dressing applied. The violent jerking movements were replaced by a few occasional twitchings. It was now found that the left side of the face and the left arm were paralyzed, with inability to close the left eye completely. The man became drowsy and confused, and was unable to give replies to any but the simplest questions. The temperature

[a] 779, xxv., 13. [b] 224, No. 1781, 356.

rose to 102°; the pupils became contracted, the right in a greater degree than the left; both reacted to light. The left leg began to lose power. There was complete anesthesia of the right eyebrow and of both eyelids and of the right cheek for an uncertain distance below the lower eyelid. The conjunctiva of the right eye became congested, and a small ulcer formed on the right cornea, which healed without much trouble. In the course of a few days power began to return, first in the left leg and afterward, though to a much less extent, in the left arm. For two weeks there was drowsiness, and the man slept considerably. He was apathetic, and for many days passed urine in bed. He could not recognize his wife or old comrades, and had also difficulty in recognizing common objects and their uses. The most remarkable feature was the loss of all memory of his life for twenty years before the accident. As time went on, the period included in this loss of memory was reduced to five years preceding the accident. The hemi-

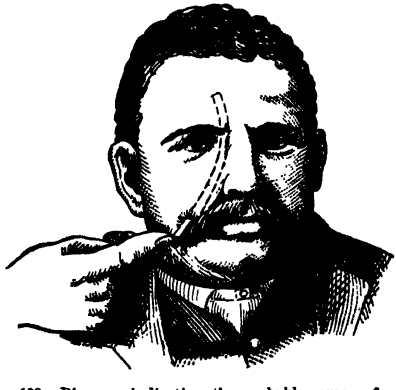


Fig. 192.—Diagram indicating the probable course of the spout; the direction was not vertical, but inclined backward (Abel and Colman).

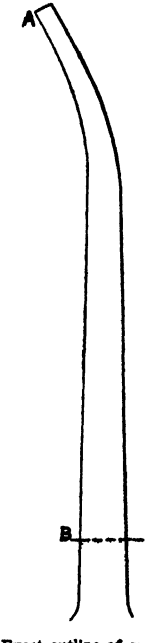


Fig. 193.—Exact outline of spout after removal; the dotted line represents position of cheek-wound; from A to B, natural size, measured 6¼ inches.

plegia persisted, although the man was able to get about. Sensibility was lost to all forms of stimuli in the right upper eyelid, forehead, and anterior part of the scalp, corresponding with the distribution of the supraorbital and nasal nerves. The cornea was completely anesthetic, and the right cheek, an inch and a half external to the angle of the nose, presented a small patch of anesthesia. There was undue emotional mobility, the patient laughing or crying on slight provocation. The condition of mind-blindness remained. It is believed that the spout of the oil-can must have passed under the zygoma to the base of the skull, perforating the great wing of the sphenoid bone and penetrating

the centrum ovale, injuring the anterior fibers of the motor tract in the internal capsule near the genu."

Figures 192 and 193 show the outline and probable course of the spout.

Beaumont[a] reports the history of an injury in a man of forty-five, who, standing but 12 yards away, was struck in the orbit by a rocket, which penetrated through the sphenoidal fissure into the middle and posterior lobes of the left hemisphere. He did not fall at the time he was struck, and fifteen minutes after the stick was removed he arose without help and walked away. Apparently no extensive cerebral lesion had been caused, and the man suffered no subsequent cerebral symptoms except, three years afterward, impairment of memory.

There is an account given by Chelius[b] of an extraordinary wound caused by a ramrod. The rod was accidentally discharged while being employed in loading, and struck a person a few paces away. It entered the head near the root of the zygomatic arch, about a finger's breadth from the outer corner of the right eye, passed through the head, emerging at the posterior superior angle of the parietal bone, a finger's breadth from the sagittal suture, and about the same distance above the superior angle of the occipital bone. The wounded man attempted to pull the ramrod out, but all his efforts were ineffectual. After the tolerance of this foreign body for some time, one of his companions managed to extract it, and when it was brought out it was as straight as the day it left the maker's shop. Little blood was lost, and the wound healed rapidly and completely; in spite of this major injury the patient recovered.

Carpenter[c] reports the curious case of an insane man who deliberately bored holes through his skull, and at different times, at a point above the ear, he inserted into his brain five pieces of No. 20 broom wire from $2\frac{1}{16}$ to $6\frac{3}{4}$ inches in length, a fourpenny nail $2\frac{1}{4}$ inches long, and a needle $1\frac{5}{8}$ inches long. Despite these desperate attempts at suicide he lived several months, finally accomplishing his purpose by taking an overdose of morphin. MacQueen[d] has given the history of a man of thirty-five, who drove one three-inch nail into his forehead, another close to his occiput, and a third into his vertex an inch in front and $\frac{1}{4}$ inch to the left of the middle line. He had used a hammer to effect complete penetration, hoping that death would result from his injuries. He failed in this, as about five weeks later he was discharged from the Princess Alice Hospital at Eastbourne, perfectly recovered. There is a record[e] of a man by the name of Bulkley who was found, by a police officer in Philadelphia, staggering along the streets, and was taken to the inebriate ward of the Blockley Hospital, where he subsequently sank and died, after having been transferred from ward to ward, his symptoms appearing inexplicable. A postmortem examination revealed the fact that an ordinary knife-blade had been driven into his brain on the right side, just above

[a] 476, 1862, i., 626. [b] 265, i. [c] 124, 1876, 426.
[d] 476, 1890, ii., 721. [e] 547, Nov. 1, 1871.

the ear, and was completely hidden by the skin. It had evidently become loosened from the handle when the patient was stabbed, and had remained in the brain several days. No clue to the assailant was found.

Thudicum [a] mentions the case of a man who walked from Strafford to Newcastle, and from Newcastle to London, where he died, and in his brain was found the breech-pin of a gun. Neiman [b] describes a severe gunshot wound of the frontal region, in which the iron breech-block of an old-fashioned muzzle-loading gun was driven into the substance of the brain, requiring great force for its extraction. The patient, a young man of twenty-eight, was unconscious but a short time, and happily made a good recovery. A few pieces of bone came away, and the wound healed with only a slight depression of the forehead. Wilson [c] speaks of a child who fell on an upright copper paper-file, which penetrated the right side of the occipital bone, below the external orifice of the ear, and entered the brain for more than three inches; and yet the child made a speedy recovery.

Baron Larrey knew of a man whose head was completely transfixed by a ramrod, which extended from the middle of the forehead to the left side of the nape of the neck; despite this serious injury the man lived two days.

Jewett [d] records the case of an Irish drayman who, without treatment, worked for forty-seven days after receiving a penetrating wound of the skull ¼ inch in diameter and four inches deep. Recovery ensued in spite of the delay in treatment.

Gunshot Injuries.—Swain [e] mentions a patient who stood before a looking glass, and, turning his head far around to the left, fired a pistol shot into his brain behind the right ear. The bullet passed into his mouth, and he spat it out. Some bleeding occurred from both the internal and external wounds; the man soon began to suffer with a troublesome cough, with bloody expectoration; his tongue was coated and drawn to the right; he became slightly deaf in his right ear and dragged his left leg in walking. These symptoms, together with those of congestion of the lung, continued for about a week, when he died, apparently from his pulmonary trouble.

Ford [f] quotes the case of a lad of fifteen who was shot in the head, ¾ inch anterior to the summit of the right ear, the ball escaping through the left os frontis, 1¼ inch above the center of the brow. Recovery ensued, with a cicatrix on the forehead, through which the pulsations of the brain could be distinctly seen. The senses were not at all deteriorated.

Richardson [g] tells of a soldier who was struck by a Minié ball on the left temporal bone; the missile passed out through the left frontal bone ½ inch to the left of the middle of the forehead. He was only stunned, and twenty-four hours later his intellect was undisturbed. There was no operation; free

[a] 536, 1884, ii., 419. [b] 520, Oct. 20, 1891. [c] 224, 1887, ii., 278.
[d] Hosp. Gaz., London, 1879, 39. [e] 224, Feb. 7, 1891.
[f] Monthly Jour. Med. Sciences, 1845, v., 653. [g] 592, 1866–67, xix., 52.

suppuration with discharges of fragments of skull and broken-down substance ensued for four weeks, when the wounds closed kindly, and recovery followed.

Angle[a] records the case of a cowboy who was shot by a comrade in mistake. The ball entered the skull beneath the left mastoid process and passed out of the right eye. The man recovered.

Rice[b] describes the case of a boy of fourteen who was shot in the head, the ball directly traversing the brain substance, some of which protruded from the wound. The boy recovered. The ball entered one inch above and in front of the right ear and made its exit through the lambdoidal suture posteriorly.

Hall of Denver, Col.,[c] in an interesting **study of gunshot wounds of the brain,** writes as follows :—

"It is in regard to injuries involving the brain that the question of the production of immediate unconsciousness assumes the greatest interest. We may state broadly that if the medulla or the great centers at the base of the brain are wounded by a bullet, instant unconsciousness must result; with any other wounds involving the brain-substance it will, with very great probability, result. But there is a very broad area of uncertainty. Many instances have been recorded in which the entrance of a small bullet into the anterior part of the brain has not prevented the firing of a second shot on the part of the suicide. Personally, I have not observed such a case, however. But, aside from the injuries by the smallest missiles in the anterior parts of the brain, we may speak with almost absolute certainty with regard to the production of unconsciousness, for the jar to the brain from the blow of the bullet upon the skull would produce such a result even if the damage to the brain were not sufficient to do so.

"Many injuries to the brain from bullets of moderate size and low velocity do not cause more than a temporary loss of consciousness, and the subjects are seen by the surgeon, after the lapse of half an hour or more, apparently sound of mind. These are the cases in which the ball has lost its momentum in passing through the skull, and has consequently done little damage to the brain-substance, excepting to make a passage for itself for a short distance into the brain. It is apparently well established that, in the case of the rifle-bullet of high velocity, and especially if fired from the modern military weapons using nitro-powders, and giving an enormous initial velocity to the bullet, the transmission of the force from the displaced particles of brain (and this rule applies to any other of the soft organs as well) to the adjacent parts is such as to disorganize much of the tissue surrounding the original track of the missile. Under these circumstances a much slighter wound would be necessary to produce unconsciousness or death than in the case of a bullet of low velocity, especially if it were light in weight. Thus I have recorded elsewhere an

[a] San Francisco Med. Jour., 1856, i., 10. [b] 218, 1849, 323. [c] 533, 1895, ii., 478.

instance of instant death in a grizzly bear, an animal certainly as tenacious of life as any we have, from a mere furrow, less than a quarter of an inch in depth, through the cortex of the brain, without injury of the skull excepting the removal of the bone necessary for the production of this furrow. The jar to the brain from a bullet of great velocity, as in this case, was alone sufficient to injure the organ irreparably. In a similar manner I have known a deer to be killed by the impact of a heavy rifle-ball against one horn, although there was no evidence of fracture of the skull. On the other hand, game animals often escape after such injuries not directly involving the brain, although temporarily rendered unconscious, as I have observed in several instances, the diagnosis undoubtedly being concussion of the brain.

"Slight injury to the brain, and especially if it be unilateral, then, may not produce unconsciousness. It is not very uncommon for a missile from a heavy weapon to strike the skull, and be deflected without the production of such a state. Near the town in which I formerly practised, the town-marshal shot at a negro, who resisted arrest, at a distance of only a few feet, with a 44-caliber revolver, striking the culprit on the side of the head. The wound showed that the ball struck the skull and plowed along under the scalp for several inches before emerging, but it did not even knock the negro down, and no unconsciousness followed later. I once examined an express-messenger who had been shot in the occipital region by a weapon of similar size, while seated at his desk in the car. The blow was a very glancing one and did not produce unconsciousness, and probably, as in the case of the negro, because it did not strike with sufficient directness."

Head Injuries with Loss of Cerebral Substance.—The brain and its membranes may be severely wounded, portions of the cranium or cerebral substance destroyed or lost, and yet recovery ensue. Possibly the most noted injury of this class was that reported by Harlow[a] and commonly known as "**Bigelow's Case**" or the "**American Crow-bar Case.**" Phineas P. Gage, aged twenty-five, a foreman on the Rutland and Burlington Railroad, was employed September 13, 1847, in charging a hole with powder preparatory to blasting. A premature explosion drove a tamping-iron, three feet seven inches long, 1¼ inches in diameter, weighing 13¼ pounds, completely through the man's head. The iron was round and comparatively smooth; the pointed end entered first. The iron struck against the left side of the face, immediately anterior to the inferior maxillary and passed under the zygomatic arch, fracturing portions of the sphenoid bone and the floor of the left orbit; it then passed through the left anterior lobe of the cerebrum, and, in the median line, made its exit at the junction of the coronal and sagittal sutures, lacerating the longitudinal sinus, fracturing the parietal and frontal bones, and breaking up considerable of the brain; the globe of the left eye protruded nearly one-half of its diameter. The patient was thrown backward and gave a few convulsive movements of

[a] 218, 1848.

the extremities. He was taken to a hotel ¾ mile distant, and during the transportation seemed slightly dazed, but not at all unconscious. Upon arriving at the hotel he dismounted from the conveyance, and without assistance walked up a long flight of stairs to the hall where his wound was to be dressed. Harlow saw him at about six o'clock in the evening, and from his condition could hardly credit the story of his injury, although his person and his bed were drenched with blood. His scalp was shaved, the coagula and debris removed, and among other portions of bone was a piece of the anterior superior angle of each parietal bone and a semicircular piece of the frontal bone, leaving an opening 3½ inches in diameter. At 10 P. M. on the day of the injury Gage was perfectly rational and asked about his work and after his friends. After a while delirium set in for a few days, and on the eleventh day he lost the vision in the left eye. His convalescence was rapid and uneventful. It was said that he discharged pieces of bone and cerebral substance from his mouth for a few days. The iron when found was smeared with blood and cerebral substance.

As was most natural such a wonderful case of cerebral injury attracted much notice. Not only was the case remarkable in the apparent innocuous loss of cerebral substance, but in the singular chance which exempted the brain from either concussion or compression, and subsequent inflammation. Professor Bigelow examined the patient in January, 1850, and made a most excellent report of the case,[a] and it is due to his efforts that the case attained world-wide notoriety. Bigelow found the patient quite recovered in his faculties of body and mind, except that he had lost the sight of the injured eye. He exhibited a linear cicatrix one inch long near the angle of the ramus of the left lower jaw. His left eyelid was involuntarily closed and he had no power to overcome his ptosis. Upon the head, well covered by the hair, was a large unequal depression and elevation. In order to ascertain how far it might be possible for a bar of the size causing the injury to traverse the skull in the track assigned to it, Bigelow procured a common skull in which the zygomatic arches were barely visible from above, and having entered a drill near the left angle of the inferior maxilla, he passed it obliquely upward to the median line of the cranium just in front of the junction of the sagittal and coronal sutures. This aperture was then enlarged until it allowed the passage of the bar in question, and the loss of substance strikingly corresponded with the lesion said to have been received by the patient. From the coronoid process of the inferior maxilla there was removed a fragment measuring about ¾ inch in length. This fragment, in the patient's case, might have been fractured and subsequently reunited. The iron bar, together with a cast of the patient's head, was placed in the Museum of the Massachusetts Medical College.

Bigelow appends an engraving (Fig. 194) to his paper. In the illustration the parts are as follows :—

[a] 124, July, 1850.

(1) Lateral view of a prepared cranium representing the iron bar traversing its cavity.

(2) Front view of same.

(3) Plan of the base seen from within. In these three figures the optic foramina are seen to be intact and are occupied by small white rods.

(4) Cast taken from the shaved head of the patient representing the appearance of the fracture in 1850, the anterior fragment being considerably elevated in the profile view.

(5) The iron bar with length and diameter in proportion to the size of the other figures.

Heaton[a] reports a case in which, by an explosion, a tamping-iron was driven through the chin of a man into the cerebrum. Although there was loss of brain-substance, the man recovered with his mental faculties unim-

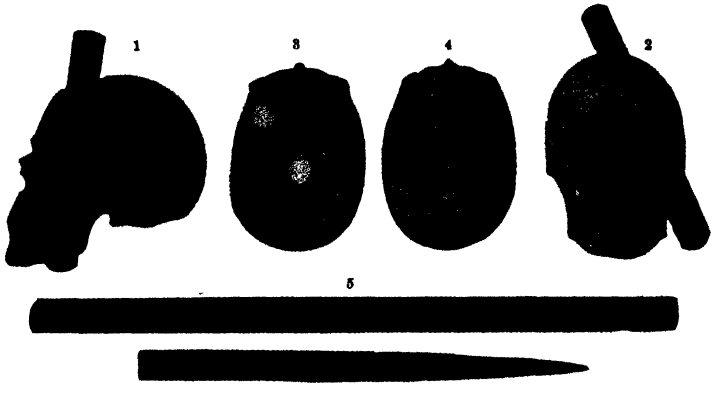


Fig. 194.—Dr. Harlow's case of recovery after the passage of an iron bar through the head.

paired. A second case was that of a man who, during an explosion, was wounded in the skull. There was visible a triangular depression, from which, possibly, an ounce of brain-substance issued. This man also recovered.

Jewett mentions a case in which an injury somewhat similar to that in Bigelow's case was produced by a gas-pipe.

Among older writers, speaking of loss of brain-substance with subsequent recovery, Brasavolus saw as much brain evacuated as would fill an egg shell; the patient afterward had an impediment of speech and grew stupid. Franciscus Arcæus gives the narrative of a workman who was struck on the head by a stone weighing 24 pounds falling from a height. The skull was fractured; fragments of bone were driven into the brain. For three days the patient was unconscious and almost lifeless. After the eighth day a cranial

[a] Trans. Detroit Med. and Library Assoc., 1879, i., 4.

abscess spontaneously opened, from the sinciput to the occiput, and a large quantity of "corruption" was evacuated. Speech returned soon after, the eyes opened, and in twenty days the man could distinguish objects. In four months recovery was entire. Bontius relates a singular accident to a sailor, whose head was crushed between a ship and a small boat; the greater part of the occipital bone was taken away in fragments, the injury extending almost to the foramen magnum. Bontius asserts that the patient was perfectly cured by another surgeon and himself. Galen mentions an injury to a youth in Smyrna, in whom the brain was so seriously wounded that the anterior ventricles were opened; and yet the patient recovered. Glandorp [380] mentions a case of fracture of the skull out of which his father took large portions of brain and some fragments of bone. He adds that the man was afterward paralyzed on the opposite side and became singularly irritable. In his "Chirurgical Observations," Job van Meek'ren tells the story of a Russian nobleman who lost part of his skull, and a dog's skull was supplied in its place. The bigoted divines of the country excommunicated the man, and would not annul his sentence until he submitted to have the bit of foreign bone removed.

Mendenhall[a] reports the history of an injury to a laborer nineteen years old. While sitting on a log a few feet from a comrade who was chopping wood, the axe glanced and, slipping from the woodman's grasp, struck him just above the ear, burying the "bit" of the axe in his skull. Two hours afterward he was seen almost pulseless, and his clothing drenched with blood which was still oozing from the wound with mixed brain-substance and fragments of bone. The cut was horizontal on a level with the orbit, 5½ inches long externally, and, owing to the convex shape of the axe, a little less internally. Small spicules of bone were removed, and a cloth was placed on the battered skull to receive the discharges for the inspection of the surgeon, who on his arrival saw at least two tablespoonfuls of cerebral substance on this cloth. Contrary to all expectation this man recovered, but, strangely, he had a marked and peculiar change of voice, and this was permanent. From the time of the reception of the injury his whole mental and moral nature had undergone a pronounced change. Before the injury, the patient was considered a quiet, unassuming, and stupid boy, but universally regarded as honest. Afterward he became noisy, self-asserting, sharp, and seemingly devoid of moral sense or honesty. These new traits developed immediately, and more strikingly so soon as convalescence was established.

Bergtold[b] quotes a case reported in 1857 [545] of extreme injury to the cranium and its contents. While sleeping on the deck of a canal boat, a man at Highspire was seriously injured by striking his head against a bridge. When seen by the surgeon his hair was matted and his clothes saturated with blood. There was a terrible gap in the scalp from the superciliary ridge to the occip-

[a] 124, 1869. [b] Medical Press of Western New York, 1888, 317.

ital bone, and, though full of clots, the wound was still oozing. In a cloth on a bench opposite were rolled up a portion of the malar bone, some fragments of the os frontis, one entire right parietal bone, detached from its fellow along the sagittal suture, and from the occipital along the lambdoidal suture, perhaps taking with it some of the occipital bone together with some of the squamous portion of the temporal bone. This bone was as clean of soft parts as if it had been removed from a dead subject with a scalpel and saw. No sight of the membranes or of the substance of the brain was obtained. The piece of cranium removed was 6¾ inches in the longitudinal diameter, and 5¾ inches in the short oval diameter. The dressing occupied an hour, at the end of which the patient arose to his feet and changed his clothes as though nothing had happened. Twenty-six years after the accident there was slight unsteadiness of gait, and gradual paralysis of the left leg and arm and the opposite side of the face, but otherwise the man was in good condition. In place of the parietal bone the head presented a marked deficiency as though a slice of the skull were cut out (Fig. 195). The depressed area measured five by six inches. In 1887 the man left the hospital in Buffalo with the paralysis improved, but his mental equilibrium could be easily disturbed. He became hysteric and sobbed when scolded.

Fig. 195.—Skull injury with extensive loss of cranial and cerebral substance.

Buchanan [a] mentions the history of a case in a woman of twenty-one, who, while working in a mill, was struck by a bolt. Her skull was fractured and driven into the brain comminuted. Hanging from the wound was a bit of brain-substance, the size of a finger, composed of convolution as well as white matter. The wound healed, there was no hernia, and at the time of report the girl was conscious of no disturbance, not even a headache. There was nothing indicative of the reception of the injury except a scar near the edge of the hair on the upper part of the right side of the forehead. Steele,[b] in a school-boy of eight, mentions a case of very severe injury to the bones of the face and head, with escape of cerebral substance, and recovery. The injury was caused by falling into machinery.

There was a seaman aboard of the U. S. S. "Constellation,"[c] who fell through a hatchway from the masthead, landing on the vertex of the head. There was copious bleeding from the ears, 50 to 60 fluid-ounces of blood oozing in a few hours, mingled with small fragments of brain-tissue. The next day the discharge became watery, and in it were found small pieces of true brain-

[a] 381, 1879. [b] 476, 1889, i., 1083. [c] 124, April, 1859.

substance. In five weeks the man returned to duty complaining only of giddiness and of a "stuffed-up" head. In 1846 there is a record of a man of forty who fell from a scaffold, erected at a height of 20 feet, striking on his head. He was at first stunned, but on admission to the hospital recovered consciousness. A small wound was found over the right eyebrow, protruding from which was a portion of brain-substance. There was slight hemorrhage from the right nostril, and some pain in the head, but the pulse and respiration were undisturbed. On the following day a fragment of the cerebral substance, about the size of a hazel-nut, together with some blood-clots, escaped from the right nostril. In this case the inner wall of the frontal sinus was broken, affording exit for the lacerated brain.

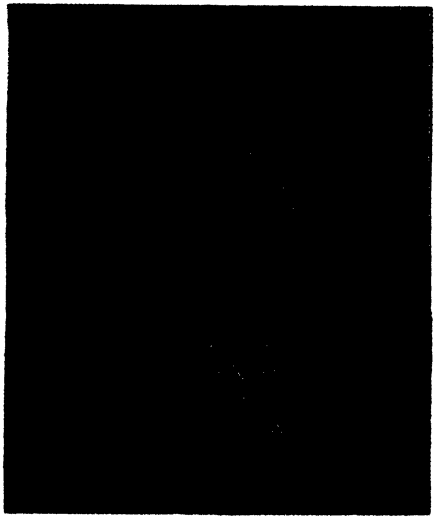


Fig. 196.—Skull injury with extensive destruction of brain-substance around the Rolandic area (Cooke and Laycock).

Cooke and Laycock[a] mention a case of intracranial injury with extensive destruction of brain-substance around the Rolandic area; there was recovery but with loss of the so-called muscular sense. The patient, a workman of twenty-nine, while cutting down a gum-tree, was struck by a branch as thick as a man's arm, which fell from 100 feet overhead, inflicting a compound comminuted fracture of the cranium. The right eye was contused but the pupils equal; the vertex-wound was full of brain-substance and pieces of bone, ten of which were removed, leaving inches. The base of the skull was fractured behind the orbits; a fissure ½ inch wide was discernible, and the right frontal bone could be easily moved. The lacerated and contused brain-substance was removed. Consciousness returned six days after the operation. The accompanying illustrations (Figs. 196 and 197) show the extent of the injury. The lower half of the ascending frontal convolution, the greater half of the sigmoid gyrus, the posterior third of the lower and middle frontal convolutions, the base and posterior end of the upper convolution, and the base of the corresponding portion of the falciform lobe were involved. The sensory and motor functions of the arm were retained in a relative degree. There was power of simple movements, but complex movements were awkward. The tactile localization was almost lost.

[a] 180. July 13, 1893.

Morton[a] mentions a patient of forty-seven, who was injured in a railroad accident near Phœnixville, Pa.; there was a compound comminuted fracture of the skull involving the left temporal, sphenoid, and superior maxillary bones. The side of the head and the ear were considerably lacerated; several teeth were broken, and besides this there was injury to the dura and cerebral substance. There was profound coma for ten days and paralysis of the 1st, 2d, 3d, 4th, 6th, and 7th cranial nerves, particularly affecting the left side of the face. There was scarcely enough blood-supply left to the orbit to maintain life in the globe. The man primarily recovered, but ninety-one days from the injury he died of cerebral abscess.

There is the record[b] of a curious brain-injury in a man of twenty-two, who was struck on the skull by a circular saw. The saw cut directly down into the brain, severing the superior longitudinal sinus, besides tearing a branch of the meningeal artery. The wound was filled with sawdust left by the saw while it was tearing through the parts. After ordinary treatment the man recovered.

Bird[c] reports a compound comminuted fracture of the left temporal region, with loss of bone, together with six drams of brain-substance, which, however, was followed by recovery. Tagert[d] gives an instance of compound depressed fracture of the skull, with loss of brain-substance, in which recovery was effected without operative interference. Ballou,[e] Bartlett,[f] Buckner, Capon,[g] Carmichael,[h] Corban,[i] Maunder,[j] and many others, cite instances of cranial fracture and loss of brain-substance, with subsequent recovery. Halsted[k] reports the history of a boy of seventeen, who, while out fowling, had the breech-pin of a shot-gun blown out, the sharp point striking the forehead in the frontal suture, crushing the os frontis, destroying 1¾ inches of the longitudinal sinus, and causing severe hemorrhage from both the longitudinal and frontal sinuses. The pin was pulled out by the boy, who washed his own face, and lay down; he soon became semi-comatose, in which condition he remained for some days; but, after operation, he made complete recovery.

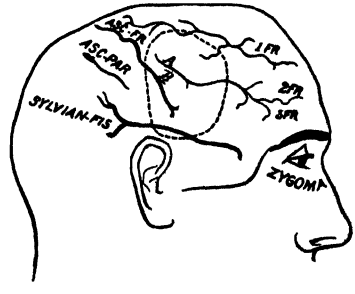


Fig. 197.—Diagrammatic sketch of injury seen in figure 196.

Loss of Brain-substance from Cerebral Tumor.—Koser is accredited with reporting results of a postmortem held on a young man of twenty who suffered from a cerebral tumor of considerable duration. It was stated that, although there was a cavity in the brain at least five inches

[a] 547, Oct. 3, 1874. [b] 130, 1861, 165. [c] 124, 1865, 552. [d] 548, 1852, 268.
[e] 298, 1883. [f] 647, 1878. [g] 548, 1879. [h] 312, 1841.
[i] 535, 1825. [j] 548, 1870. [k] 703, 1870, 131.

in length, the patient, almost up to the time of death, was possessed of the senses of touch, taste, hearing, and smell, showed considerable control over his locomotor muscles, and could talk. In fact, he was practically discommoded in no other way than by loss of vision, caused by pressure on the optic centers. It was also stated that the retention of memory was remarkable, and, up to within two weeks of his death, the patient was able to memorize poems. The amount of involvement discovered post-mortem in cases similar to the preceding is astonishing. At a recent pathologic display in London[619] several remarkable specimens were shown.

Extensive Fractures of the Skull.—Jennings[a] mentions an instance of extensive fracture of the skull, 14 pieces of the cranium being found (Fig. 198). The patient lived five weeks and two days after the injury, the immediate cause of death being edema of the lungs. His language was incoherent and full of oaths. Belloste, in his "Hospital Surgeon," states that he had under his care a most dreadful case of a girl of eleven or twelve years, who received 18 or 19 cutlass wounds of the head, each so violent as to chip out pieces of bone; but, notwithstanding her severe injuries, she made recovery. At the Emergency Hospital in Washington, D. C., there was received a negress with at least six gaping wounds of the head, in some cases denuding the periosteum and cutting the cranium. During a debauch the night before she had been engaged in a quarrel with a negro with whom she lived, and was struck by him several times on the head with an axe. She lay all night unconscious, and was discovered the next morning with her hair and clothes and the floor on which she lay drenched with blood. The ambulance was summoned to take her to the morgue, but on the arrival of the police it was seen that feeble signs of life still existed. On admission to the hospital she was semi-comatose, almost pulseless, cold, and exhibiting all the signs of extreme hemorrhage and shock. Her head was cleaned up, but her condition would not permit of any other treatment than a corrosive-sublimate compress and a bandage of Scultetus. She was taken to the hospital ward, where warmth and stimulants were applied, after which she completely reacted. She progressed so well that it was not deemed advisable to remove the head-bandage until the fourth day, when it was seen that the wounds had almost entirely healed and suppuration was virtually absent. The patient rapidly and completely recovered, and her neighbors, on

Fig. 198.—Cranial fracture (14 fragments) (Jennings).

[a] 124, May, 1891.

her return home, could hardly believe that she was the same woman whom, a few days before, they were preparing to take to the morgue.

A serious injury, which is not at all infrequent, is that caused by **diving into shallow water,** or into a bath from which water has been withdrawn. Curran[a] mentions a British officer in India who, being overheated, stopped at a station bath in which the previous night he had had a plunge, and without examining, took a violent "header" into the tank, confidently expecting to strike from eight to ten feet of water. He dashed his head against the concrete bottom 12 feet below (the water two hours previously having been withdrawn) and crushed his brain and skull into an indistinguishable mass.

There are many cases on record in which an injury, particularly a gunshot wound of the skull, though showing no external wound, has caused death by producing a **fracture of the internal table of the cranium.** Paré[618] gives details of the case of a nobleman whose head was guarded by a helmet and who was struck by a ball, leaving no external sign of injury, but it was subsequently found that there was an internal fracture of the cranium. Tulpius[842] and Scultetus are among the older writers reporting somewhat similar instances, and there are several analogous cases reported as having occurred during the War of the Rebellion. Boling[b] reports a case in which the internal table was splintered to a much greater extent than the external.

Fracture of the base of the skull is ordinarily spoken of as a fatal injury, reported instances of recovery being extremely rare, but Battle,[c] in a paper on this subject, has collected numerous statistics of nonfatal fracture of the base of the brain, viz.:—

	Male.	Female.	
Anterior fossa,	16	5	
Middle fossa,	50	6	
Posterior fossa,	10	1	
Middle and anterior fossæ,	15	5	
Middle and posterior fossæ,	4	1	
Anterior, middle, and posterior fossæ,	1	.	
	96	18	Total, 114.

In a paper on nonmortal fractures of the base of the skull, Lidell[d] gives an account of 135 cases. MacCormac[e] reports a case of a boy of nine who was run over by a carriage drawn by a pair of horses. He suffered fracture of the base of the skull, of the bones of the face, and of the left ulna, and although suppuration at the points of fracture ensued, followed by an optic neuritis, an ultimate recovery was effected. Ball, an Irish surgeon, has collected several instances in which the base of the skull has been driven in and the condyle of the jaw impacted in the opening by force transmitted through the lower maxilla.

The tolerance of foreign bodies in the brain is most marvelous. In the ancient chronicles of Kœnigsberg there is recorded the history of a man

[a] 476, 1886, ii., 579. [b] 817, 1844. [c] 476, 1890, ii., 1.
[d] 124, lxxxi., 1881, 335. [e] 476, 1886, ii., 209.

who for fourteen years carried in his head a piece of iron as large as his finger. After its long lodgment, during which the subject was little discommoded, it finally came out by the palatine arch. There is also an old record of a ball lodging near the sella turcica for over a year, the patient dying suddenly of an entirely different accident. Fabricius Hildanus[334] relates the history of an injury, in which, without causing any uncomfortable symptoms, a ball rested between the skull and dura for six months.

Amatus Lusitanus[119] speaks of a drunken courtesan who was wounded in a fray with a long, sharp-pointed knife which was driven into the head. No apparent injury resulted, and death from fever took place eight years after the reception of the injury. On opening the head a large piece of knife was found between the skull and dura. It is said that Benedictus mentions a Greek who was wounded, at the siege of Colchis, in the right temple by a dart and taken captive by the Turks; he lived for twenty years in slavery, the wound having completely healed. Obtaining his liberty, he came to Sidon, and five years after, as he was washing his face, he was seized by a violent fit of sneezing, and discharged from one of his nostrils a piece of the dart having an iron point of considerable length.

In about 1884 there died in the Vienna Hospital[a] a bookbinder of forty-five, who had always passed as an intelligent man, but who had at irregular intervals suffered from epileptic convulsions. An iron nail covered with rust was discovered in his brain; from the history of his life and from the appearances of the nail it had evidently been lodged in the cerebrum since childhood.

Slee[b] mentions a case in which, after the death of a man from septic peritonitis following a bullet-wound of the intestines, he found postmortem a knife-blade $\frac{5}{16}$ inch in width projecting into the brain to the depth of one inch. The blade was ensheathed in a strong fibrous capsule $\frac{1}{2}$ inch thick, and the adjacent brain-structure was apparently normal. The blade was black and corroded, and had evidently passed between the sutures during boyhood as there was no depression or displacement of the cranial bones. The weapon had broken off just on a level with the skull, and had remained in situ until the time of death without causing any indicative symptoms. Slee does not state the man's age, but remarks that he was a married man and a father at the time of his death, and had enjoyed the best of health up to the time he was shot in the abdomen. Callaghan, quoted in Erichsen's "Surgery," remarks that he knew of an officer who lived seven years with a portion of a gun-breech weighing three ounces lodged in his brain.

Lawson[c] mentions the impaction of a portion of a breech of a gun in the forehead of a man for twelve years, with subsequent removal and recovery. Waldon[d] speaks of a similar case in which a fragment of the breech weighing three ounces penetrated the cranium, and was lodged in the brain for two months previous to the death of the patient.

[a] 545, Nov. 1, 1884. [b] 533, July 25, 1891. [c] 224, 1869. [d] 564, 1799.

Huppert[a] tells of the lodgment of a slate-pencil three inches long in the brain during lifetime, death ultimately being caused by a slight head-injury. Larry mentions a person who for some time carried a six ounce ball in the brain and ultimately recovered. Peter[b] removed a musket-ball from the frontal sinus after six years' lodgment, with successful issue. Mastin[c] has given an instance in which the blade of a pen-knife remained in the brain six months, recovery following its removal. Camden[d] reports a case in which a ball received in a gunshot wound of the brain remained in situ for thirteen years; Cronyn[e] mentions a similar case in which a bullet rested in the brain for eight years. Doyle[f] successfully removed an ounce Minié ball from the brain after a fifteen years' lodgment.

Pipe-stems, wires, shot, and other foreign bodies, are from time to time recorded as remaining in the brain for some time. Wharton[g] has compiled elaborate statistics on this subject, commenting on 316 cases in which foreign bodies were lodged in the brain, and furnishing all the necessary information to persons interested in this subject.

Fig. 199.—Warren's apparatus for resorting to the method of Taliacotius.

Injuries of the nose, with marked deformity, are in a measure combated by devices invented for restoring the missing portions of the injured member. Taliacotius, the distinguished Italian surgeon of the sixteenth century, devised an operation which now bears his name, and consists in fashioning a nose from the fleshy tissues of the arm. The arm is approximated to the head and held in this position by an apparatus or system of bandages for about ten days, at which time it is supposed that it can be severed, and further trimming and paring of the nose is then practised. A column is subsequently made from the upper lip. In the olden days there was a humorous legend representing Taliacotius making noses for his patients from the gluteal regions of other persons, which statement, needless to say, is not founded on fact. Various **modifications and improvements on the Taliacotian method** have been made (Fig. 199); but in recent years the Indian method, introduced by Carpue into England in 1816, is generally preferred. Syme of Edinburgh, Wood, and Ollier have devised methods of restoring the nose, which bear their names.

Ohmann-Dumesnil[h] reports a case of rhinophyma in a man of seventy-two, an alcoholic, who was originally affected with acne rosacea, on whom he performed a most successful operation for restoration. The accompanying

[a] 155, 1875.
[b] 133, 1870, ii.
[c] 681, 1873.
[d] Trans. Med. Soc. W. Va., 1877.
[e] 230, 1871-2, xi., 194.
[f] South. Med. Rec., Atlanta, 1878, 323.
[g] 547, 1879, ix., 493.
[h] International Med. Mag., Phila., Feb., 1894.

illustration (Fig. 200) shows the original deformity—a growth weighing two pounds—and also pictures the appearance shortly after the operation. This case is illustrative of the possibilities of plastic surgery in the hands of a skilful and ingenious operator.

About 1892 Dr. J. P. Parker then of Kansas City, Mo., restored the missing bridge of a patient's nose by laying the sunken part open in two long flaps, denuding the distal extremity of the little finger of the patient's right hand of nail, flesh, tendons, etc., and binding it into the wound of the nose until firm union had taken place. The finger was then amputated at the second joint and the plastic operation completed, with a result pleasing both to patient and operator.

There is a case quoted [a] of a young man who, when first seen by his medical attendant, had all the soft parts of the nose gone, except one-third of the left ala

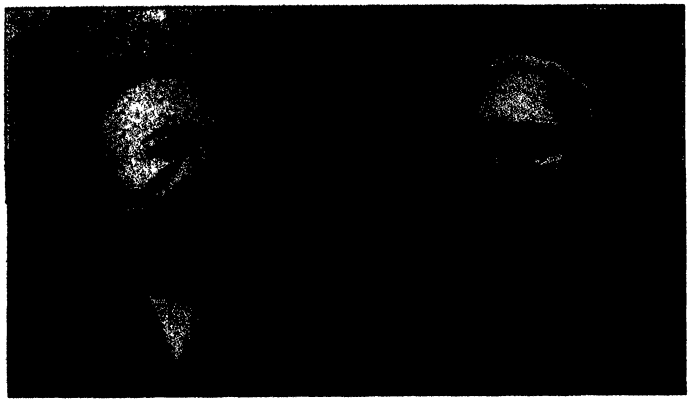


Fig. 200.—Case of rhinophyma before and after operation (Ohmann-Dumesnil)

and a thin flap of the septum which was lying on the upper lip. The missing member was ferreted out and cleansed, and after an hour's separation sutured on. The nostrils were daily syringed with a corrosive sublimate solution, and on the tenth day the dressing was removed; the nose was found active and well, with the single exception of a triangular notch on the right side, which was too greatly bruised by the violence of the blow to recover. When we consider the varicosity of this organ we can readily believe the possibility of the foregoing facts, and there is little doubt that more precaution in suturing severed portions of the nose would render the operation of nose-making a very rare one.

Maxwell [b] mentions a curious case of attempted suicide in which the ball, passing through the palatine process of the superior maxillary bone, crushing the vomer to the extent of its own diameter, fell back through the right nostril into the pharynx, was swallowed, and discharged from the anus.

[a] 536, 1890, ii., 240. [b] 246, 1869.

Deformities of the nose causing enormous development, or the condition called "**double-nose**" by Bartholinus, Borellus, Bidault, and others, are ordinarily results of a pathologic development of the sebaceous glands. In some cases tumors develop from the root of the nose, forming what appears to be a second nose. In other cases monstrous vegetations divide the nose into many tumors. In the early portion of this century much was heard about a man who was a daily habitue of the Palais-Royal Gardens. His nose was divided into unequally sized tumors, covering nearly his entire face. Similar instances have been observed in recent years. Hey mentions a case in which the tumor extended to the lower part of the under lip, which compressed the patient's mouth and nostrils to such an extent that while sleeping, in order to insure sufficient respiration, he had to insert a tin-tube into one of his nostrils. Imbert de Lannes[a] is quoted as operating on a former Mayor of Angoulême. This gentleman's nose was divided into five lobes by sarcomatous tumors weighing two pounds, occupying the external surface of the face, adherent to the buccinator muscles to which they extended, and covering the chin. In the upright position the tumors sealed the nostrils and mouth, and the man had to bend his head before and after respiration. In eating, this unfortunate person had to lift his tumors away from his mouth, and during sleep the monstrous growths were supported in a sling attached to his night-cap. He presented such a hideous aspect that he was virtually ostracized from society. The growth had been in progress for twelve years, but during twenty-two months' confinement in Revolutionary prisons the enlargement had been very rapid. Fournier says that the most beautiful result followed the operation, which was considered quite hazardous.

Foreign bodies in the nose present phenomena as interesting as wounds of this organ. Among the living objects which have been found in the nose may be mentioned flies, maggots, worms, leeches, centipedes, and even lizards. Zacutus Lusitanus tells of a person who died in two days from the effects of **a leech** which was inadvertently introduced into the nasal fossa, and there is a somewhat similar case[b] of a military pharmacist, a member of the French army in Spain, who drank some water from a pitcher and exhibited, about a half hour afterward, a persistent hemorrhage from the nose. Emaciation progressively continued, although his appetite was normal. Three doctors, called in consultation, prescribed bleeding, which, however, proved of no avail. Three weeks afterward he carried in his nostril a tampon of lint, wet with an astringent solution, and, on the next day, on blowing his nose, there fell from the right nostril a body which he recognized as a leech. Healey[c] gives the history of four cases in which medicinal leeches were removed from the mouth and posterior nares of persons who had, for some days previously, been drinking turbid water. Sinclair[d] mentions the removal of a leech from the posterior nares.

[a] 302, iv., 209.
[b] 662, 1st series, T. x., 406.
[c] Trans. Med. and Phys. Soc., Calcutta, 1842.
[d] 224, 1885, i., 1246.

In some regions, more particularly tropical ones, there are certain **flies** that crawl into the nostrils of the inhabitants and deposit eggs in the cavities. The larvæ develop and multiply with great rapidity, and sometimes gain admission into the frontal sinus, causing intense cephalalgia, and even death.

Dempster[a] reports an instance of the lodgment of numerous live **maggots** within the cavity of the nose, causing sloughing of the palate and other complications. Nicholson[b] mentions a case of ulceration and abscess of the nostrils and face from which maggots were discharged. Jarvis[c] gives the history of a strange and repeated hemorrhage from the nose and adjacent parts that was found to be due to maggots from the ova of a fly, which had been deposited in the nose while the patient was asleep. Tomlinson[d] gives a case in which maggots traversed the Eustachian tube, some being picked out of the nostrils, while others were coughed up. Packard[e] records the accidental entrance of a **centipede** into the nostril. There is an account[f] of a native who was admitted to the Madras General Hospital, saying that a small **lizard** had crawled up his nose. The urine of these animals is very irritating, blistering any surface it touches. Despite vigorous treatment the patient died in consequence of the entrance of this little creature.

There have been instances among the older writers in which a **pea** has remained in the nose for such a length of time as to present evidences of sprouting. The Ephemerides renders an instance of this kind, and Breschet cites the history of a young boy, who, in 1718, introduced a pea into his nostril; in three days it had swollen to such an extent as to fill the whole passage. It could not be extracted by an instrument, so tobacco snuff was used, which excited sneezing, and the pea was ejected.

Vidal and the Ephemerides report several instances of **tolerance of foreign bodies in the nasal cavities** for from twenty to twenty-five years. Wiesman, in 1893, reported a rhinolith, which was composed of a cherry-stone enveloped in chalk, that had been removed after a sojourn of sixty years, with intense ozena as a consequence of its lodgment. Waring[g] mentions the case of a housemaid who carried a rhinolith, with a cherry-stone for a nucleus, which had been introduced twenty-seven years before, and which for twenty-five years had caused no symptoms. Grove[h] describes a necrosed inferior turbinated bone, to which was attached a coffee-grain which had been retained in the nostril for twenty years. Hickman[i] gives an instance of a steel ring which for thirteen and a half years had been impacted in the nasopharyngeal fossa of a child. It was detected by the rhinoscope and was removed. Parker[j] speaks of a gunbreech bolt which was removed from the

[a] 434, 1836, i., 449. [b] 500, 1842, iv., 345. [c] 594, 1847, ix., 315.
[d] 272, 1872. [e] 545, xxix., 100. [f] 548, 1876, ii., 717. [g] 224, 1893.
[h] Trans. Path. Soc., Phila., 1874, 25. [i] 224, 1867, ii., 266. [j] 476, 1885, i., 378.

nose after five years' lodgment. Major [a] mentions the removal of a foreign body from the nose seven years after its introduction.

Howard [b] removed a large thimble from the posterior nares, although it had remained in its position for some time undetected. Eve reports a case in which a thimble was impacted in the right posterior nares. Gazdar [c] speaks of a case of persistent neuralgia of one-half of the face, caused by a foreign body in the nose. The obstruction was removed after seven years' lodgment, and the neuralgia disappeared. Molinier [d] has an observation on the extraction of a fragment of a knife-blade which had rested four years in the nasal fossæ, where the blade had broken off during a quarrel.

A peculiar habit, sometimes seen in nervous individuals, is that of "**swallowing the tongue.**" Cohen claims that in some cases of supposed laryngeal spasm the tongue is swallowed, occluding the larynx, and sometimes with fatal consequences. There are possibly a half score of cases recorded, but this anomaly is very rare, and Major [e] is possibly the only one who has to a certainty demonstrated the fact by a laryngoscopic examination. By the laryngoscope he was enabled to observe a paroxysm in a woman, in which the tongue retracted and impinged on the epiglottis, but quickly recovered its position. Pettit mentions suffocation from "tongue swallowing," both with and without section of the frenum. Schobinger [f] cites a similar instance, due to loosening of the frenum.

Analogous to the foregoing phenomenon is the habit of "**tongue sucking.**" Morris [g] mentions a young lady of fifteen who spontaneously dislocated her jaw, owing indirectly to this habit. Morris says that from infancy the patient was addicted to this habit, which was so audible as to be heard in all parts of the room. The continued action of the pterygoid muscles had so preternaturally loosened the ligaments and muscular structures supporting the joint as to render them unable to resist the violent action of "tongue sucking" even during sleep.

Injuries to the Tongue.—Hobbs [h] describes a man of twenty-three who, while working, had a habit of protruding his tongue. One day he was hit under the chin by the chain of a crane on a pier, his upper teeth inflicting a wound two inches deep, three inches from the tip, and dividing the entire structure of the tongue except the arteries. The edges of the wound were brought into apposition by sutures, and after the removal of the latter perfect union and complete restoration of the sensation of taste ensued. Franck [350] mentions **regeneration of a severed tongue**; and Van Wy has seen union of almost entirely severed parts of the tongue. De Fuisseaux [i] reports reunion of the tongue by suture after almost complete transverse division.

[a] 252, xv. [b] 612, 1852–3, v., 215. [c] 435, xviii., 341.
[d] 662, 1854, xiv., 291. [e] 252, 1884–5, 611. [f] 401, v.
[g] 224, 1872, ii., 242. [h] 536, 1887, 78. [i] Arch. Belges de Méd. Milt., 1851.

There is an account [a] of a German soldier who, May 2, 1813, was wounded at the battle of Gross-Görschen by a musket ball which penetrated the left cheek, carrying away the last four molars of the upper jaw and passing through the tongue, making exit on the left side, and forcing out several teeth of the left lower jaw. To his surprise, thirty years afterward, one of the teeth was removed from an abscess of the tongue. Baker [b] speaks of a boy of thirteen who was shot at three yards distance. The bullet knocked out two teeth and passed through the tongue, although it produced no wound of the pharynx, and was passed from the anus on the sixth day. Stevenson [c] mentions a case of an organist who fell forward when stooping with a pipe in his mouth, driving its stem into the roof of the pharynx. He complained of a sore throat for several days, and, after explanation, Stevenson removed from the soft palate a piece of clay pipe nearly 1¼ inches long. Herbert tells of a case resembling carcinoma of the tongue, which was really due to the lodgment of a piece of tooth in that organ.

Articulation Without the Tongue.—Total or partial destruction of the tongue does not necessarily make articulation impossible. Banon [d] mentions a man who had nothing in his mouth representing a tongue. When he was young, he was attacked by an ulceration destroying every vestige of this member. The epiglottis, larynx, and pharynx, in fact the surrounding structures were normal, and articulation, which was at first lost, became fairly distinct, and deglutition was never interfered with. Paré gives a description of a man whose tongue was completely severed, in consequence of which he lost speech for three years, but was afterward able to make himself understood by an ingenious bit of mechanism. He inserted under the stump of the tongue a small piece of wood, in a most marvelous way replacing the missing member. Articulation with the absence of some constituent of the vocal apparatus has been spoken of on page 254.

Hypertrophy of the Tongue.—It sometimes happens that the tongue is so large that it is rendered not only useless but a decided hindrance to the performance of the ordinary functions into which it always enters. Ehrlich, Ficker, Klein,[e] Rodtorffer, and the Ephemerides, all record instances in which a large tongue was removed either by ligation or amputation. Von Siebold [f] records an instance in which death was caused by the ligature of an abnormally sized tongue. There is a modern record of three cases of enormous tongues, the result of simple hypertrophy.[g] In one case the tongue measured 6¼ inches from the angle of the mouth about the sides and tip to the opposite angle, necessitating amputation of the protruding portion.

Carnochan [h] reports a case in which hypertrophy of the tongue was reduced to nearly the normal size by first tying the external carotid, and

[a] 476, 1846, i., 173. [b] 224, 1883, i., 457. [c] 224, 1890, ii., 205.
[d] 312, 1864, iii., 60. [e] 735, i., 665. [f] 735, i., 651.
[g] 548, 1853, i., 202. [h] Am. Med. Gaz. and Jour. Health, N. Y., 1856, vii., 1.

six weeks later the common carotid artery. Chalk[a] mentions partial dislocation of the lower jaw from an enlarged tongue. Lyford[b] speaks of enlargement of the tongue causing death.

The above conditions are known as **macroglossia**, which is a congenital hypertrophy of the tongue analogous to elephantiasis. It is of slow growth, and as the organ enlarges it interferes with deglutition and speech. It may protrude over the chin and reach even as far down as the sternum (Fig. 201).

The great enlargement may cause deformities of the teeth and lower jaw, and even present itself as an enormous tumor in the neck (Fig. 202). The protruding tongue itself may ulcerate, possibly bleed, and there is constant dribbling of saliva. The disease is probably due to congenital defect aggravated by frequent attacks of glossitis, and the treatment consists in the removal of the protruding portions by the knife, ligation, the cautery, or écraseur.

Fig. 201.—Macroglossia in a girl eleven years old (after Humphrey).

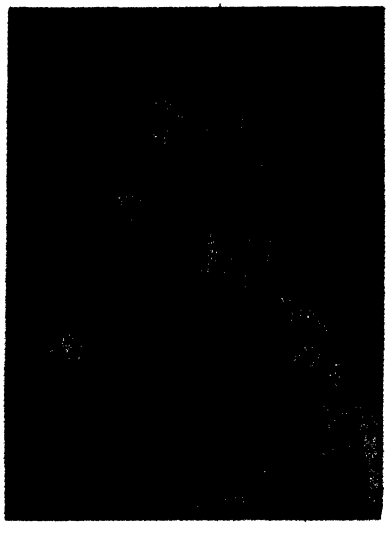


Fig. 202.—Macroglossia (Keen and White).

Living Fish in the Pharynx.—Probably the most interesting cases of foreign bodies are those in which living fish enter the pharynx and esophagus. Chevers[266] has collected five cases in which death was caused by living fish entering the mouth and occluding the air-passages. He has mentioned a case in which a large catfish jumped into the mouth of a Madras

[a] 779, viii., 305. [b] 476, 1827–8, i., 16.

bheestie. An operation on the esophagus was immediately commenced, but abandoned, and an attempt made to push the fish down with a probang, which was, in a measure, successful. However, the patient gave a convulsive struggle, and, to all appearances, died. The trachea was immediately opened, and respiration was restored. During the course of the night the man vomited up pieces of fish bone softened by decomposition. In 1863 White mentions that the foregoing accident is not uncommon among the natives of India, who are in the habit of swimming with their mouths open in tanks abounding with fish. There is a case[a] in which a fisherman, having both hands engaged in drawing a net, and seeing a sole-fish about eight inches long trying to escape through the meshes of the net, seized it with his teeth. A sudden convulsive effort of the fish enabled it to enter the fisherman's throat, and he was asphyxiated before his boat reached the shore. After death the fish was found in the cardiac end of the stomach. There is another case of a man named Durand, who held a mullet between his teeth while rebaiting his hook. The fish, in the convulsive struggles of death, slipped down the throat, and because of the arrangement of its scales it could be pushed down but not up; asphyxiation, however, ensued. Stewart[b] has extensively described the case of a native "Puckally" of Ceylon who was the victim of the most distressing symptoms from the impaction of a living fish in his throat. The native had caught the fish, and in order to extract it placed its head between his teeth, holding the body with the left hand and the hook with the right. He had hardly extracted the hook, when the fish pricked his palm with his long and sharp dorsal fin, causing him suddenly to release his grasp on the fish and voluntarily open his mouth at the same time. The fish quickly bolted into his mouth, and, although he grasped the tail with his right hand, and squeezed his pharynx with his left, besides coughing violently, the fish found its way into the esophagus. Further attempts at extraction were dangerous and quite likely to fail; his symptoms were distressing, he could not hold his head erect without the most agonizing pain and he was almost prostrated from fright and asphyxia; it was thought advisable to push the fish into the stomach, and after an impaction of sixteen hours the symptoms were relieved. The fish in this instance was the *Anabas scandens* or "walking perch" of Ceylon, which derives its name from its power of locomotion on land and its ability to live out of water for some time. It is from four to five inches long and has a dorsal fin as sharp as a knife and directed toward the tail, and pectoral fins following the same direction; these would admit of entrance, but would interfere with extraction. MacLauren[c] reports the history of a young man who, after catching a fish, placed it between his teeth. The fish, three inches long, by a sudden movement, entered the pharynx. Immediately ensued suffocation, nausea, vomiting, together with the expectoration of blood and mucus. There was emphysema of the face, neck, and chest. The

[a] 548, 1863, i., 333. [b] 476, Sept. 25, 1868. [c] 476, 1873.

fish could be easily felt impacted in the tissues, but, after swallowing much water and vinegar, together with other efforts at extraction, the fins were loosened—about twenty-four hours after the accident. By this time the emphysema had extended to the scrotum. There was much expectoration of muco-purulent fluid, and on the third day complete aphonia, but the symptoms gradually disappeared, and recovery was complete in eight days. Dantra is accredited [a] with describing asphyxiation, accompanied by great agony, in a man who, while swimming, had partially swallowed a live fish. The fish was about three inches in length and one in breadth, and was found lying on the dorsum of his tongue and, together with numerous clots of blood, filled his mouth. Futile attempts to extract the fish by forceps were made. Examination showed that the fish had firmly grasped the patient's uvula, which it was induced to relinquish when its head was seized by the forceps and pressed from side to side. After this it was easily extracted and lived for some time. There was little hemorrhage after the removal of the offending object, and the blood had evidently come from the injuries to the sides of the mouth, caused by the fins. The uvula was bitten, not torn. There is an interesting account of a native of India, who, while fishing in a stream, caught a flat eel-like fish from fifteen to sixteen inches long. After the fashion of his fellows he attempted to kill the eel by bitting off its head; in the attempt the fish slipped into his gullet, and owing to its sharp fins could not be withdrawn. The man died one hour later in the greatest agony; so firmly was the eel impacted that even after death it could not be extracted, and the man was buried with it protruding from his mouth.

A Leech in the Pharynx.—Granger, a surgeon in Her Majesty's Indian Service,[b] writes:—"Several days ago I received a note from the political sirdar, asking me if I would see a man who said he had a leech in his throat which he was unable to get rid of. I was somewhat sceptical, and thought that possibly the man might be laboring under a delusion. On going outside the fort to see the case, I found an old Pathan graybeard waiting for me. On seeing me, he at once spat out a large quantity of dark, half-clotted blood to assure me of the serious nature of his complaint. His history—mostly made out with the aid of interpreters—was that eleven days ago he was drinking from a rain-water tank and felt something stick in his throat, which he could not reject. He felt this thing moving, and it caused difficulty in swallowing, and occasionally vomiting. On the following day he began to spit up blood, and this continued until he saw me. He stated that he once vomited blood, and that he frequently felt that he was going to choke. On examining his throat, a large clot of blood was found to be adherent to the posterior wall of the pharynx. On removing this clot of blood, no signs of the presence of a leech could be detected. However, on account of the symptoms complained of by the patient I introduced a polypus forceps

[a] 548, 1878, ii., 504. [b] 224, 1895, ii., 695.

into the lower part of the pharynx and toward the esophagus, where a body, distinctly moving, was felt. This body I seized with the forceps, and with considerable force managed to remove it. It was a leech between 2½ and three inches in length, and with a body of the size of a Lee-Metford bullet. No doubt during the eleven days it had remained in the man's throat the leech had increased in size. Nevertheless it must have been an animal of considerable size when the man attempted to swallow it. I send this case as a typical example of the carelessness of natives of the class from which we enlist our Sepoys, as to the nature of the water they drink. This man had drunk the pea-soup like water of a tank dug in the side of the hill, rather than go a few hundred yards to a spring where the water is perfectly clear and pure. Though I have not met with another case of leeches being taken with drinking water, I am assured that such cases are occasionally met with about Agra and other towns in the North-West Provinces. This great carelessness as to the purity or impurity of their drinking water shows the difficulty medical officers must experience in their endeavors to prevent the Sepoys of a regiment from drinking water from condemned or doubtful sources during a cholera or typhoid epidemic."

Foreign Bodies in the Pharynx and Esophagus.—Aylesbury[a] mentions a boy who swallowed a fish-hook while eating gooseberries. He tried to pull it up, but it was firmly fastened, and a surgeon was called. By ingeniously passing a leaden bullet along the line, the weight of the lead loosened the hook, and both bullet and hook were easily drawn up. Babbit and Battle[b] report an ingenious method of removing a piece of meat occluding the esophagus—the application of trypsin. Henry[c] speaks of a German officer who accidentally swallowed a piece of beer bottle, ⅝ x ⅛ inch, which subsequently penetrated the esophagus, and in its course irritated the recurrent laryngeal and vagi, giving rise to the most serious phlegmonous inflammation and distressing respiratory symptoms. A peculiar case[d] is that of the man who died after a fire at the Eddystone Lighthouse. He was endeavoring to extinguish the flames which were at a considerable distance above his head, and was looking up with his mouth open, when the lead of a melting lantern dropped down in such quantities as not only to cover his face and enter his mouth, but run over his clothes. The esophagus and tunica in the lower part of the stomach were burned, and a great piece of lead, weighing over 7½ ounces, was taken from the stomach after death.

Evans[e] relates the history of a girl of twenty-one who swallowed four artificial teeth, together with their gold plate; two years and eight days afterward she ejected them after a violent attack of retching. Gauthier[f] speaks of a young girl who, while eating soup, swallowed a fragment of bone. For a long time she had symptoms simulating phthisis, but fourteen years afterward the

[a] 374, 1738, viii., 380. [b] 604, 1887. [c] 178, 1882.
[d] 629, 1756, part ii. [e] 476, 1879, ii., 75. [f] 663, T., xxxiv., 13.

bone was dislodged, and, although the young woman was considered in the last stages of phthisis, she completely recovered in six weeks. Gastellier[a] has reported the case of a young man of sixteen who swallowed a crown piece, which became lodged in the middle portion of the esophagus and could not be removed. For ten months the piece of money remained in this position, during which the young man was never without acute pain and often had convulsions. He vomited material, sometimes alimentary, sometimes mucus, pus, or blood, and went into the last stage of marasmus. At last, after this long-continued suffering, following a strong convulsion and syncope, the coin descended to the stomach, and the young man expectorated great quantities of pus. After thirty-five years, the coin had not been passed by the rectum.

Instances of **migration of foreign bodies from the esophagus** are repeatedly recorded. There is an instance[b] of a needle which was swallowed and lodged in the esophagus, but twenty-one months afterward was extracted by an incision at a point behind the right ear. Kerckring speaks of a girl who swallowed a needle which was ultimately extracted from the muscles of her neck. Poulet [641] remarks that Vigla has collected the most interesting of these cases of migration of foreign bodies. Hévin mentions several cases of grains of wheat abstracted from abscesses of the thoracic parietes, from thirteen to fifteen days after ingestion. Bonnet and Helmontius have reported similar facts. Volgnarius has seen a grain of wheat make its exit from the axilla, and Polisius mentions an abscess of the back from which was extracted a grain of wheat three months after ingestion. Bally[c] reports a somewhat similar instance, in which, three months after ingestion, during an attack of peripneumonia, a foreign body was extracted from an abscess of the thorax, between the 2d and 3d ribs. Ambrose[d] found a needle encysted in the heart of a negress. She distinctly stated that she had swallowed it at a time calculated to have been nine years before her death. Planque speaks of a small bone perforating the esophagus and extracted through the skin.

Abscess or ulceration, consequent upon periesophagitis, caused by the lodgment of foreign bodies in the esophagus, often leads to the most serious results. There is an instance [662] of a soldier who swallowed a bone while eating soup, who died on the thirty-first day from the rupture internally of an esophageal abscess. Grellois[e] has reported the history of a case of a child twenty-two months old, who suffered for some time with impaction of a small bone in the esophagus. Less than three months afterward the patient died with all the symptoms of marasmus, due to difficult deglutition, and at the autopsy an abscess was seen in the posterior wall of the pharynx, opposite the 3d cervical vertebra; extensive caries was also noticed in the bodies of the 2d, 3d, and 4th cervical vertebræ. Guattani[f] mentions a curious instance in which a man playing with a chestnut threw it in the air, catching it in his

[a] 458, T. xxiii., 147. [b] 641, 113. [c] Acad. de Médecine, 1824.
[d] 538, 1870. [e] 458, T. xiii., 1807. [f] 641, 119.

mouth. The chestnut became lodged in the throat and caused death on the nineteenth day. At the autopsy it was found that an abscess communicating with the trachea had been formed in the pharynx and esophagus.

A peculiarly fatal accident in this connection is that in which a foreign body in the esophagus ulcerates, and penetrates one of the neighboring major vessels. Colles[a] mentions a man of fifty-six who, while eating, perceived a sensation as of a rent in the chest. The pain was augmented during deglutition, and almost immediately afterward he commenced to expectorate great quantities of blood. On the following day he vomited a bone about an inch long and died on the same day. At the autopsy it was found that there was a rent in the posterior wall of the esophagus, about ½ inch long, and a corresponding wound of the aorta. There was blood in the pleura, pericardium, stomach, and intestines. There is one case in which a man of forty-seven suddenly died, after vomiting blood, and at the autopsy it was demonstrated that a needle had perforated the posterior wall of the esophagus and wounded the aorta.[b] Poulet has collected[c] 31 cases in which ulceration caused by foreign bodies in the esophagus has resulted in perforation of the walls of some of the neighboring vessels. The order of frequence was as follows: aorta, 17; carotids, four; vena cava, two; and one case each of perforation of the inferior thyroid artery, right coronary vein, demi-azygos vein, the right subclavicular artery (abnormal), and the esophageal artery. In three of the cases collected there was no autopsy and the vessel affected was not known.

In a child of three years that had swallowed a half-penny, Atkins[d] reports rupture of the innominate artery. No symptoms developed, but six weeks later, the child had an attack of ulcerative stomatitis, from which it seemed to be recovering nicely, when suddenly it ejected two ounces of bright red blood in clots, and became collapsed out of proportion to the loss of blood. Under treatment, it rallied somewhat, but soon afterward it ejected four ounces more of blood and died in a few minutes. At the autopsy ¾ pint of blood was found in the stomach, and a perforation was discovered on the right side of the esophagus, leading into a cavity, in which a blackened half-penny was found. A probe passed along the aorta into the innominate protruded into the same cavity about the bifurcation of the vessel.

Denonvilliers has described a perforation of the esophagus and aorta by a five-franc piece. A preserved preparation of this case, showing the coin in situ, is in the Musée Dupuytren (Fig. 203). Blaxland[e] relates the instance of a woman of forty-five who swallowed a fish bone, was seized with violent hematemesis, and died in eight hours. The necropsy revealed a penetration of the aorta through the thoracic portion of the esophagus. There is also in the Musée Dupuytren a preparation described by Bousquet, in which the aorta and the esophagus were perforated by a very irregular piece of bone

[a] 313, 1855, T. xix., 25. [b] 476, 1877, ii., 789. [c] 641, 122.
[d] 224, May 4, 1895. [e] 490, 1847, iv., 647.

(Fig. 204). Mackenzie mentions an instance of death from perforation of the aorta by a fish-bone.

In some cases penetration of the esophagus allows the further penetration of some neighboring membrane or organ in the same manner as the foregoing cases. Dudley[a] mentions a case in which fatal hemorrhage was caused by penetration of the esophagus and lung by a chicken-bone. Buist[b] speaks of a patient who swallowed two artificial teeth. On the following day there was pain in the epigastrium, and by the fourth day the pain extended to the vertebræ, with vomiting, delirium, and death on the fifth day. At the autopsy it was found that a foreign body, seven cm. long had perforated the

Fig. 203.—Perforation of esophagus and aorta by a five-franc piece (coin in situ) (after Poulet).

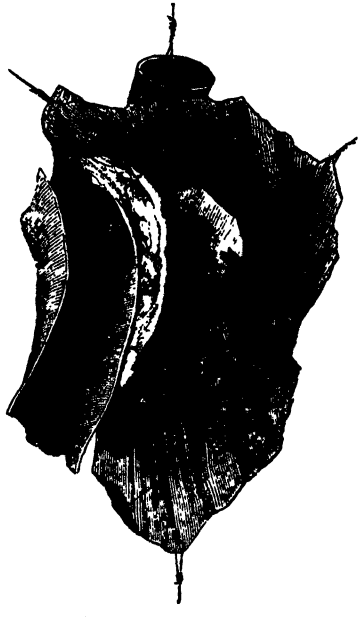


Fig. 204.—Perforation of aorta by a piece of bone (after Poulet).

pericardium, causing a suppurative pericarditis. Dagron[242] reports a unique instance of death by purulent infection arising from perforation of the esophagus by a pin. The patient was a man of forty-two, and, some six weeks before he presented himself for treatment, before swallowing had experienced a severe pain low down in the neck. Five days before admission he had had a severe chill, followed by sweating and delirium. He died of a supraclavicular abscess on the fifth day; a black steel pin was found against the esophagus and trachea.

In connection with foreign bodies in the esophagus, it might be interesting

[a] 648, 1858. [b] 264, 1858.

to remark that Ashhurst[a] has collected **129 cases of esophagotomy** for the removal of foreign bodies, resulting in 95 recoveries and 34 deaths. Gaudolphe[b] collected 142 cases with 110 recoveries.

Injuries of the neck are usually inflicted with suicidal intent or in battle. Cornelius Nepos says that while fighting against the Lacedemonians, Epaminondas was sensible of having received a mortal wound, and apprehending that the lance was stopping a wound in an important vessel, remarked that he would die when it was withdrawn. When he was told that the Bœotians had conquered, exclaiming "I die unconquered," he drew out the lance and perished. Petrus de Largenta speaks of a man with an arrow in one of his carotids, who was but slightly affected before its extraction, but who died immediately after the removal of the arrow. Among the remarkable recoveries from injuries of the neck is that mentioned by Boerhaave, of a young man who lived nine or ten days after receiving a sword-thrust through the neck between the 4th and 5th vertebræ, dividing the vertebral artery. Benedictus, Bonacursius, and Monroe, all mention recovery after cases of cut-throat in which the esophagus as well as the trachea was wounded, and food protruded from the external cut. Warren[c] relates the history of a case in which the vertebral artery was wounded by the discharge of a pistol loaded with pebbles. The hemorrhage was checked by compression and packing, and after the discharge of a pebble and a piece of bone from the wound, the man was seen a month afterward in perfect health. Corson of Norristown, Pa., has reported the case of a quarryman who was stabbed in the neck with a shoemaker's knife, severing the left carotid one inch below its division. He was seen thirty minutes later in an apparently lifeless condition, but efforts at resuscitation were successfully made. The hemorrhage ceased spontaneously, and at the time of report, the man presented the symptoms of one who had had his carotid ligated (facial atrophy on one side, no pulse, etc.). Baron Larrey[478] mentions a case of gunshot wound in which the carotid artery was open at its division into internal and external branches, and says that the wound was plugged by an artilleryman until ligation, and in this primitive manner the patient was saved. Sale[d] reports the case of a girl of nineteen, who fell on a china bowl that she had shattered, and wounded both the right common carotid artery and internal jugular vein. There was profuse and continuous hemorrhage for a time, and subsequently a false aneurysm developed, which ruptured in about three months, giving rise to enormous momentary hemorrhage; notwithstanding the severity of the injury and the extent of the hemorrhage, complete recovery ensued. Amos[e] relates the instance of a woman named Mary Green who, after complete division of all the vessels of the neck, walked 23 yards and climbed over an ordinary bar-gate nearly four feet high.

[a] 174, 385. [b] 497, Jan. 20, 1895. [c] 218, 1862, lxvi., 389.
[d] 124, 1879, 281. [e] 490, 1832, x., 183.

Cholmeley reports the instance of a Captain of the First Madras Fusileers, who was wounded at Pegu by a musket-ball penetrating his neck. The common carotid was divided and for five minutes there was profuse hemorrhage which, however, strange to say, spontaneously ceased. The patient died in thirty-eight hours, supposedly from spinal concussion or shock.[a]

Relative to **ligature of the common carotid artery,** Ashhurst mentions the fact that the artery has been ligated in 228 instances, with 94 recoveries. Ellis[b] mentions ligature of both carotids in four and a half days, as a treatment for a gunshot wound, with subsequent recovery. Lewtas[c] reports a case of ligation of the innominate and carotid arteries for traumatic aneurysm (likely a hematoma due to a gunshot injury of the subclavian artery). The patient was in profound collapse, but steadily reacted and was discharged cured on the forty-fifth day, with no perceptible pulse at the wrist and only a feeble beat in the pulmonary artery.

Garengeot, Wirth, Fine, and Evers, all mention **perforating wounds of the trachea and esophagus with recoveries.** Van Swieten and Hiester mention cases in which part of the trachea was carried away by a ball, with recovery. Monro, Tulpius, Bartholinus, and Paré report severance of the trachea with the absence of oral breathing, in which the divided portions were sutured, with successful results. In his "Theatro Naturæ" Bodinus says that William, Prince of Orange, lost the sense of taste after receiving a wound of the larynx; according to an old authority, a French soldier became mute after a similar accident. Davies-Colley[d] mentions a boy of eighteen who fell on a stick about the thickness of the index finger, transfixing his neck from right to left; he walked to a doctor's house, 250 yards away, with the stick in situ. In about two weeks he was discharged completely well. During treatment he had no hemorrhage of any importance, and his voice was not affected, but for a while he had slight dysphagia.

Barker[e] gives a full account of a barber who was admitted to a hospital two and a half hours after cutting his throat. He had a deep wound running transversely across the neck, from one angle of the jaw to the other, cutting open the floor of the mouth and extending from the inner border of the sterno-cleido-mastoid to the other, leaving the large vessels of the neck untouched. The razor had passed through the glosso-epiglottidean fold, a tip of the epiglottis, and through the pharynx down to the spinal column. There was little hemorrhage, but the man could neither swallow nor speak. The wound was sutured, tracheotomy done, and the head kept fixed on the chest by a copper splint. He was ingeniously fed by esophageal tubes and rectal enemata; in three weeks speech and deglutition were restored. Shortly afterward the esophageal tube was removed and recovery was virtually complete. Little[f] mentions an extraordinary case of a woman of thirty-six who was discharged

[a] 548, 1855, 538. [b] 594, 1845. [c] 224, 1889.
[d] 476, 1882. [e] 436, May 16, 1894. [f] 476, 1889, ii., 91.

from Garland's asylum, where she had been an inmate for three months. This unfortunate woman had attempted suicide by **self-decapitation from behind forward.** She was found, knife in hand, with a huge wound in the back of the neck and her head bobbing about in a ghastly manner. The incision had severed the skin, subcutaneous tissues and muscles, the ligaments and bone, opening the spinal canal, but not cutting the cord. The instrument used to effect this major injury was a blunt potato-peeling knife. Despite this terrible wound the patient lived to the sixth day.

Hislop[a] records a case of cut-throat in a man of seventy-four. He had a huge gaping wound of the neck, extending to within a half inch of the carotids on each side. The trachea was almost completely severed, the band left was not more than ¼ inch wide. Hislop tied four arteries, brought the ends of the trachea together with four strong silk sutures, and, as the operation was in the country, he washed the big cavity of the wound out with cold spring-water. He brought the superficial surfaces together with ten interrupted sutures, and, notwithstanding the patient's age, the man speedily recovered. This emphasizes the fact that the old theory of leaving wounds of this nature open was erroneous. Solly[b] reports the case of a tailor of twenty-two who attempted suicide by cutting through the larynx, entirely severing the epiglottis and three-fourths of the pharynx. No bleeding point was found, and recovery ensued.

Cowles[c] describes the case of a soldier of thirty-five who, while escaping from the patrols, was shot by the Officer of the Day with a small bullet from a pistol. The ball entered the right shoulder, immediately over the supra-scapular notch, passed superficially upward and forward into the neck, wounding the esophagus posteriorly at a point opposite the thyroid cartilage, and lodged in the left side of the neck. The patient had little hemorrhage, but had expectorated and swallowed much blood. He had a constant desire to swallow, which continued several days. The treatment was expectant; and in less than three weeks the soldier was returned to duty. From the same authority there is a condensation of five reports of gunshot wounds of the neck, from all of which the patients recovered and returned to duty.

Braman[d] describes the case of a man on whom several injuries were inflicted by a drunken companion. The first wound was slight; the second a deep flesh-wound over the trapezius muscle; the third extended from the right sterno-cleido-mastoid midway upward to the middle of the jaw and down to the raphe of the trachea. The external jugular, the external thyroid, and the facial arteries were severed. Braman did not find it necessary to ligate, but was able to check the hemorrhage with lint and persulphate of iron, in powder, with pressure. After fourteen hours the wound was closed; the patient recovered, and was returned to duty in a short time.

[a] 476, June 30, 1894. [b] 476, 1864, i., 94. [c] 847, 23. [d] 847, 90.

Thomas[a] has reported the case of a man sixty-five years old who, in an attempt at suicide with a penknife, had made a deep wound in the left side of the neck. The sternohyoid and omohyoid muscles were divided; the internal jugular vein was cut through, and its cut ends were collapsed and ¾ inch apart; the common carotid artery was cut into, but not divided; the thyroid cartilage was notched, and the external and anterior jugular veins were severed. Clamp-forceps were immediately applied to the cut vessels and one on each side the aperture in the common carotid from which a small spurt of blood, certainly not half a teaspoonful, came out. The left median basilic vein was exposed by an incision, and 20 ounces of warm saline solution were slowly perfused, an ordinary glass syringe with a capacity of five ounces, with an India-rubber tubing attached to a canula in the vein, being employed. After seven ounces of fluid had been injected, the man made a short, distinct inspiration; at ten ounces a deeper one (the radial pulse could now be felt beating feebly); at 15 ounces the breathing became regular and deep; at 18 ounces the man opened his eyes, but did not appear to be conscious. The clamped vessels were now tied with catgut and the wound cleansed with phenol lotion and dressed with cyanid-gauze. The man was surrounded by hot-water bottles and the foot of the bed elevated 18 inches. In the course of an hour the patient had recovered sufficiently to answer in a squeaky voice to his name when called loudly. Improvement proceeded rapidly until the twenty-second day, when violent hemorrhage occurred, preceded a few hours previously by a small trickle, easily controlled by pressure. The wound was at once opened and blood found oozing from the distal extremities of the carotid artery and jugular vein, which were promptly clamped. The common carotid artery was not sound, so that ligatures were applied to the internal and external carotids and to the internal jugular with a small branch entering into it. The patient was in great collapse, but quickly rallied, only to suffer renewed hemorrhage from the internal carotid nine days later. This was controlled by pressure with sponges, and a quart of hot water was injected into the rectum. From this time on the patient made a slow recovery, a small sinus in the lower part of the neck disappearing on the removal of the catgut ligature.

Adams[b] describes the case of a woman who attempted suicide with a common table-knife, severing the thyroid, cricoid, and first three rings of the trachea, and lacerating the sternohyoid and thyroid arteries; she finally recovered.

There is a curious case of suicide[c] of a woman who, while under the effects of opium, forced the handle of a mirror into her mouth. From all appearances, the handle had broken off near the junction and she had evidently fallen forward with the remaining part in her mouth, driving it forcibly against the spine, and causing the point of the handle to run downward in

[a] 224, No. 1823, p. 1420 [b] 476, 1850, i., 699. [c] 476, 1889, ii., 608.

front of the cervical vertebræ. On postmortem examination, a sharp piece of wood about two inches long, corresponding to the missing portion of the broken mirror handle, was found lying between the posterior wall of the esophagus and the spine. Hennig[a] mentions a case of gunshot wound of the neck in which the musket ball was lodged in the posterior portion of the neck and was subsequently discharged by the anus.

Injuries of the cervical vertebræ, while extremely grave, and declared by some authors to be inevitably fatal, are, however, not always followed by death or permanently bad results. Barwell[b] mentions a man of sixty-three who, in a fit of despondency, threw himself from a window, having fastened a rope to his neck and to the window-sill. He fell 11 or 12 feet, and in doing so suffered a subluxation of the 4th cervical vertebra. It slowly resumed the normal position by the elasticity of the intervertebral fibrocartilage, and there was complete recovery in ten days. Lazzaretto[c] reports the history of the case of a seaman whose atlas was dislocated by a blow from a falling sail-yard. The dislocation was reduced and held by adhesive strips, and the man made a good recovery. Vanderpool of Bellevue Hospital, N. Y.,[d] describes a fracture of the odontoid process caused by a fall on the back of the head; death, however, did not ensue until six months later. According to Ashhurst,[e] Philips, the elder Cline, Willard Parker, Bayard, Stephen Smith, May, and several other surgeons, have recorded complete recovery after fracture of the atlas and axis. The same author also adds that statistic investigation shows that as large a proportion as 18 per cent. of injuries of the cervical vertebræ occurring in civil practice, recover. However, the chances of a fatal issue in injuries of the vertebræ vary inversely with the distance of the point of injury from the brain. Keen has recorded a case in which a conoidal ball lodged in the body of the third cervical vertebra, from which it was extracted six weeks later. The paralysis, which, up to the time of extraction, had affected all four limbs, rapidly diminished. In about five weeks after the removal of the bullet nearly the entire body of the 3d cervical vertebra, including the anterior half of the transverse process and vertebral foramen, was spontaneously discharged. Nearly eight years afterward Keen saw the man still living, but with his right shoulder and arm diminished in size and partly paralyzed.

Doyle[f] reports a case of dislocated neck with recovery. During a runaway the patient was thrown from his wagon, and was soon after found on the roadside apparently dead. Physicians who were quickly summoned from the immediate neighborhood detected faint signs of life; they also found a deformity of the neck, which led them to suspect dislocation. An ambulance was called, and without any effort being made to relieve the deformity the man was placed in it and driven to his home about a mile distant. The jolting

[a] 316, 1817. [b] 224, 1882, 369. [c] 318, 1813, ix., 165.
[d] Archives of Clinical Surgery, N. Y., 1877, ii., 116. [e] 174, 353. [f] 231, Jan., 1896.

over the rough roads greatly aggravated his condition. When Doyle saw the patient, his general appearance presented a hopeless condition, but being satisfied that a dislocation existed, Doyle immediately prepared to reduce it. Two men were told to grasp the feet and two more the head, and were directed to make careful but strong extension. At the same time the physician placed his right hand against the neck just over the pomum Adami, and his left against the occiput, and, while extension was being made, he flexed the head forward until the chin nearly touched the breast, after which the head was returned to its normal position. The manipulation was accompanied by a clicking sensation, caused by the replacement of the dislocated vertebra. The patient immediately showed signs of relief and improved rapidly. Perceptible but feeble movements were made by all the limbs except the right arm. The patient remained in a comatose condition for eight or nine days, during which he had enuresis and intestinal torpor. He suffered from severe concussion of the brain, which accounted for his prolonged coma. Delirium was present, but he was carefully watched and not allowed to injure himself. His recovery was tedious and was delayed by several relapses. His first complaint after consciousness returned (on the tenth day) was of a sense of constriction about the neck, as if he were being choked. This gradually passed off, and his improvement went on without development of any serious symptoms. At the time of report he appeared in the best of health and was quite able to attend to his daily avocations. Doyle appends to his report the statement that among 394 cases embraced in Ashhurst's statistics, in treatment of dislocations in the cervical region, the mortality has been nearly four times greater when constitutional or general treatment has been relied on exclusively than when attempts had been made to reduce the dislocation by extension, rotation, etc. Doyle strongly advocates attempts at reduction in such cases.

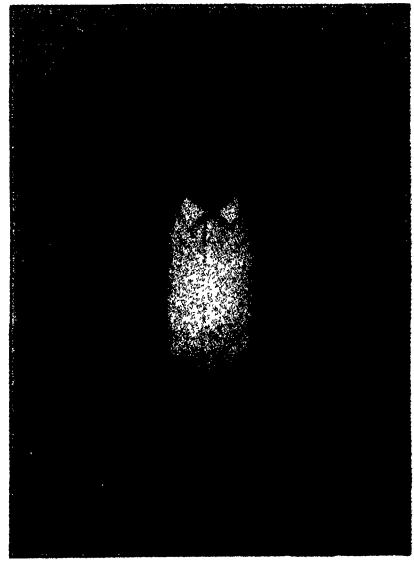


Fig. 205.—B. Baldwin, "the switchman with the broken neck."

Figure 205 represents a photograph of Barney Baldwin, a switchman of the Louisville and Nashville Railroad, who, after recovery from cervical dislocation, exhibited himself about the country, never appearing without his suspensory apparatus.

Acheson[a] records a case of luxation of the cervical spine with recovery after the use of a jury-mast. The patient was a man of fifty-five, by trade a train-conductor. On July 10, 1889, he fell backward in front of a train, his head striking between the ties; the brake-body caught his body, pushing it forward on his head, and turned him completely over. Three trucks passed over him. When dragged from beneath the train, his upper extremities were paralyzed. At noon the next day, nineteen hours after the accident, examination revealed bruises over the body, and he suffered intense pain at the back of the neck and base of the skull. Posteriorly, the neck presented a natural appearance; but anteriorly, to use the author's description, his neck resembled a combined case of mumps and goiter. The sternomastoid muscle bulged at the angle of the jaw, and was flaccid, and his "Adam's apple" was on a level with the chin. Sensation in the upper extremities was partially restored, and, although numb, he now had power of movement in the arms and hands, but could not rotate his neck. A diagnosis of cervical dislocation was made, and violent extension, with oscillation forward and backward, was practised, and the abnormal appearance subsided at once. No crepitus was noticed. On the fourth day there was slight hemorrhage from the mouth, which was more severe on the fifth and sixth days. The lower jaw had been forced past the upper, until the first molar had penetrated the tissues beneath the tongue. A plaster-of-Paris apparatus was applied, and in two months was exchanged for one of sole-leather. In rising from the recumbent position the man had to lift his head with his hands. Fifty days after the accident he suffered excruciating pain at the change of the weather, and at the approach of a storm the joints, as well as the neck, were involved. It was believed (one hundred and seven days after the accident) that both fracture and luxation existed. His voice had become guttural, but examination of the fauces was negative. The only evidence of paralysis was in the fingers, which, when applied to anything, experienced the sensation of touching gravel. The mottling of the tissues of the neck, which appeared about the fiftieth day, had entirely disappeared.

According to Thorburn,[b] Hilton had a patient who lived fourteen years with paraplegia due to fracture of the 5th, 6th, and 7th cervical vertebræ. Shaw is accredited with a case in which the patient lived fifteen months, the fracture being above the 4th cervical vertebra.

In speaking of **foreign bodies in the larynx and trachea,** the first to be considered will be liquids. There is a case on record[c] of an infant who was eating some coal, and being discovered by its mother was forced to rapidly swallow some water. In the excitement, part of the fluid swallowed fell into the trachea, and death rapidly ensued. It is hardly necessary to mention the instances in which pus or blood from ruptured abscesses entered the trachea and caused subsequent asphyxiation. A curious instance is

[a] 124, March, 1890. [b] 224, Oct. 27, 1894. [c] 641, 365.

reported by Gaujot of Val-de-Grâce of a soldier who was wounded in the Franco-Prussian war, and into whose wound an injection of the tincture of iodin was made. The wound was of such an extent as to communicate with a bronchus, and by this means the iodin entered the respiratory tract, causing suffocation. According to Poulet, Vidal de Cassis mentions an inmate of the Charité Hospital, in Paris, who, full of wine, had started to vomit; he perceived Corvisart, and knew he would be questioned, therefore he quickly closed his mouth to hide the proofs of his forbidden ingestion. The materials in his mouth were forced into the larynx, and he was immediately asphyxiated. Laënnec, Mérat, and many other writers have mentioned death caused by the entrance of vomited materials into the air-passages. Parrot[a] has observed a child who died by the penetration of chyme into the air-passages. The bronchial mucous and underlying membrane were already in a process of digestion. Behrend, Piégu, and others cite analogous instances.

The presence of a foreign body in the larynx is at all times the cause of distressing symptoms, and, sometimes, a substance of the smallest size will cause death. There is a curious accident recorded[b] that happened to a young man of twenty-three, who was anesthetized in order to extract a tooth. A cork had been placed between the teeth to keep the mouth open. The tooth was extracted but slipped from the forceps, and, together with the cork, fell into the pharynx. The tooth was ejected in an effort at vomiting, but the cork entered the larynx, and, after violent struggles, asphyxiation caused death in an hour. The autopsy demonstrated the presence of the cork in the larynx. A somewhat analogous case, though not ending fatally, was reported by Hertz[c] of a woman of twenty-six, who was anesthetized for the extraction of the right second inferior molar. The crown broke off during the operation, and immediately after the extraction she had a fit of coughing. About fifteen days later she experienced pain in the lungs. Her symptoms increased to the fifth week, when she became so feeble as to be confined to her bed. A body seemed to be moving in the trachea, synchronously with respiration. At the end of the fifth week the missing crown of the tooth was expelled after a violent fit of coughing; the symptoms immediately ameliorated, and recovery was rapid thereafter. Aronsohn[d] speaks of a child who was playing with a toy wind-instrument, and in his efforts to forcibly aspirate air through it, the child drew the detached reed into the respiratory passages, causing asphyxiation. At the autopsy the foreign body was found at the superior portion of the left bronchus. There are other cases in which, while sucking oranges or lemons, seeds have been aspirated; and there is a case in which, in a like manner, the claw of a crab was drawn into the air-passages. There are two cases mentioned[e] in which children playing with toy balloons, which they inflated with their breath, have, by inspiration, reversed them and

[a] 789, 1885, ii., 167. [b] 272, 1867. [c] 296, 1873.
[d] Thèse de Strasbourg, 1856. [e] 476, 1886, i., 758.

drawn the rubber of the balloon into the opening of the glottis, causing death. Aronsohn, who has already been quoted, and whose collection of instances of this nature is probably the most extensive, speaks of a child in the street who was eating an almond; a carriage threw the child down and he suddenly inspired the nut into the air-passages, causing immediate asphyxia. The same author also mentions a soldier walking in the street eating a plum, who, on being struck by a horse, suddenly started and swallowed the seed of the fruit. After the accident he had little pain or oppression, and no coughing, but twelve hours afterward he rejected the seed in coughing.

A curious accident is that in which a foreign body thrown into the air and caught in the mouth has caused immediate asphyxiation. Suetonius [754] transmits the history of a young man, a son of the Emperor Claudius, who, in sport, threw a small pear into the air and caught it in his mouth, and, as a consequence, was suffocated. Guattani [568] cites a similar instance of a man who threw up a chestnut, which, on being received in the mouth, lodged in the air-passages; the man died on the nineteenth day. Brodie reported the classic observation of the celebrated engineer, Brunel, who swallowed a piece of money thrown into the air and caught in his mouth. It fell into the open larynx, was inspired, causing asphyxiation, but was removed by inversion of the man's body.

Sennert says that Pope Adrian IV. died from the entrance of a fly into his respiratory passages; and Remy and Gautier record instances of the penetration of small fish into the trachea. There are, again, instances of leeches in this location.

Occasionally the **impaction of artificial teeth in the** neighborhood of the **larynx** has been **unrecognized** for many years. Lennox Browne [a] reports the history of a woman who was supposed to have either laryngeal carcinoma or phthisis, but in whom he found, impacted in the larynx, a plate with artificial teeth attached, which had remained in this position twenty-two months unrecognized and unknown. The patient, when questioned, remembered having been awakened in the night by a violent attack of vomiting, and finding her teeth were missing assumed they were thrown away with the ejections. From that time on she had suffered pain and distress in breathing and swallowing, and became the subject of progressive emaciation. After the removal of the impacted plate and teeth she soon regained her health. Paget [b] speaks of a gentleman who for three months, unconsciously, carried at the base of the tongue and epiglottis, very closely fitted to all the surface on which it rested, a full set of lost teeth and gold palate-plate. From the symptoms and history it was suspected that he had swallowed his set of false teeth, but, in order to prevent his worrying, he was never informed of this suspicion, and he never once suspected the causes of his symptoms.

Wrench [c] mentions a case illustrative of the extent to which imagination

[a] 536, 1860, ii., 588. [b] 548, 1862, i., 59. [c] 476, 1880, i., 71.

may produce symptoms simulating those ordinarily caused by the swallowing of false teeth. This man awoke one morning with his nose and throat full of blood, and noticed that his false teeth, which he seldom removed at night, were missing. He rapidly developed great pain and tumor in the larynx, together with difficulty in deglutition and speech. After a fruitless search, with instrumental and laryngoscopic aid, the missing teeth were found—in a chest of drawers; the symptoms immediately subsided when the mental illusion was relieved.

There is a curious case of a man drowned near Portsmouth.[a] After the recovery of his body it was seen that his false teeth were impacted at the anterior opening of the glottis, and it was presumed that the shock caused by the plunge into the cold water had induced a violent and deep inspiration which carried the teeth to the place of impaction.

Perrin[b] reports a case of an old man of eighty-two who lost his life from the impaction of a small piece of meat in the trachea and glottis. In the Musée Val-de-Grâce is a prepared specimen of this case showing the foreign body in situ (Fig. 206). In the same museum Perrin has also deposited a preparation from the body of a man of sixty-two, who died from the entrance of a morsel of beef into the respiratory passages. At the postmortem a mobile mass of food about the size of a hazel-nut was found at the base of the larynx at the glossoepiglottic fossa. About the 5th ring of the trachea the caliber of this organ was obstructed by a cylindric alimentary bolus about six inches long, extending almost to the bronchial division (Fig. 207). Ashhurst shows a fibrinous cast, similar to that found in croup, caused by a foreign body removed by Wharton, together with a shawl-pin, from a patient at the Children's Hospital seven hours after the performance of tracheotomy. Search for the foreign body at the time of the operation was prevented by profuse hemorrhage.

Fig. 206.—Foreign body in trachea and glottis.

Fig. 207.—Foreign body in trachea.

The ordinary instances of foreign bodies in the larynx and trachea are so common that they will not be mentioned here. Their variety is innumerable and it is quite possible for more than two to be in the same location simultaneously. In his treatise on this subject Gross says that he has seen two, three, and even four substances simultaneously or successively penetrate the

[a] 476, 1882, i., 964.

[b] 641, 403.

same location. Bérard [a] presented a stick of wood extracted from the vocal cords of a child of ten, and a few other similar instances are recorded.

The Medical Press and Circular [b] finds in an Indian contemporary some curious instances of misapplied ingenuity on the part of certain habitual criminals in that country. The discovery on a prisoner of a heavy leaden bullet about ¾ inch in diameter led to an inquiry as to the object to which it was applied. It was ascertained that it served to aid in the formation of a pouch-like recess at the base of the epiglottis. The ball is allowed to slide down to the desired position, and it is retained there for about half an hour at a time. This operation is repeated many times daily until a pouch the desired size results, in which criminals contrive to secrete jewels, money, etc., in such a way as to defy the most careful search, and without interfering in any way with speech or respiration. Upward of 20 prisoners at Calcutta were found to be provided with this pouch-formation. The resources of the professional malingerer are exceedingly varied, and testify to no small amount of cunning. The taking of internal irritants is very common, but would-be in-patients very frequently overshoot the mark and render recovery impossible. Castor-oil seeds, croton beans, and sundry other agents are employed with this object in view, and the medical officers of Indian prisons have to be continually on the lookout for artificially induced diseases that baffle diagnosis and resist treatment. Army surgeons are not altogether unfamiliar with these tricks, but compared with the artful Hindoos the British soldier is a mere child in such matters.

Excision of the larynx has found its chief indication in carcinoma, but has been employed in sarcoma, polypi, tuberculosis, enchondroma, stenosis, and necrosis. Whatever the procedure chosen for the operation, preliminary tracheotomy is a prerequisite. It should be made well below the isthmus of the thyroid gland, and from three to fifteen days before the laryngectomy. This affords time for the lungs to become accustomed to the new manner of breathing, and the trachea becomes fixed to the anterior wall of the neck.

Powers and White [c] have gathered 69 cases of either total or partial extirpation of the larynx, to which the 240 cases collected and analyzed by Eugene Kraus, in 1890, have been added. The histories of six new cases are given. Of the 309 operations, 101, or 32 per cent. of the patients, died within the first eight weeks from shock, hemorrhage, pneumonia, septic infection, or exhaustion. The cases collected by these authors show a decrease in the death ratio in the total excision,—29 per cent. as against 36 per cent. in the Kraus tables. The mortality in the partial operation is increased, being 38 per cent. as opposed to 25 per cent. Cases reported as free from the disease before the lapse of three years are of little value, except in that they diminish, by so much, the operative death-rate. Of 180 laryngectomies for carcinoma prior to January 1, 1892, 72, or 40 per cent., died as a result of the operation; 51 of

[a] 242, 1833, viii., 60. [b] 536, 1889, ii., 189. [c] 538, March 23, 1895.

the remaining 108 had recurrence during the first year, and 11, or ten per cent. of the survivors, were free from relapse three or more years after operation. In 77 cases of partial laryngectomy for cancer, 26, or 33 per cent., died during the first two months; of the remaining 51, seven cases, or 13 per cent., are reported as free from the disease three or more years after the operation.

Injuries destroying great portions of the face or jaw, but not causing death, are seldom seen, except on the battle-field, and it is to military surgery that we must look for the most striking instances of this kind. Ribes[a] mentions a man of thirty-three who, in the Spanish campaign in 1811, received an injury which carried away the entire body of the lower jaw, half of each ramus, and also mangled in a great degree the neighboring soft parts. He was transported from the field of battle, and, despite enormous hemorrhage and suppuration, in two months recovered. At the time of report the wounded man presented no trace of the inferior maxillary bone, but by carrying the finger along the side of the pharynx in the direction of the superior dental arch the coronoid apophyses could be recognized, and about six lines nearer the temporal extremity the ramus could be discovered. The tongue was missing for about one-third its length, and was thicker than natural and retracted on the hyoid bone. The sublingual glands were adherent to the under part of the tongue and were red and over-developed. The inferior parts of the cheeks were cicatrized with the lateral and superior regions of the neck, and with the base of the tongue and the hyoid bone. The tongue was free under and in front of the larynx. The patient used a gilded silver plate to fix the tongue so that deglutition could be carried on. He was not able to articulate sounds, but made himself understood through the intervention of this plate, which was fixed to a silver chin. The chin he used to maintain the tongue-plate, to diminish the deformity, and to retain the saliva, which was constantly dribbling on the neck (Fig. 208). The same author quotes the instance of a man of fifty, who, during the siege of Alexandria in 1801, was struck in the middle of his face, obliquely, by a cannon-ball, from below upward and from right to left. A part of the right malar bone, the two superior maxillary bones, the nasal bones, the cartilage, the vomer, the middle lamina of the ethmoid, the left maxillary bone, a portion of the left zygomatic arch, and a great portion of the inferior maxilla were carried away, or comminuted, and all the soft parts correspondingly lacerated. Several hours afterward this soldier was counted among the number of dead, but Larrey, the surgeon-in-chief of the army, with his typical vigilance and humanity, remarked that the patient gave signs of life, and that, despite the magnitude of his wound, he did not despair of his recovery. Those portions in which attrition was very great were removed, and the splinters of bone taken out, showing an enormous wound. Three months were

[a] 302, xxix., 424.

necessary for cicatrization, but it was not until the capitulation of Marabou, at which place he was wounded, that the patient was returned to France. At this time he presented a hideous aspect. There were no signs of nose, nor cartilage separating the entrance of the nostrils, and the vault of the nasal fossa could be easily seen. There was a part of the posterior region of the right superior maxilla, but the left was entirely gone—in fact, the man presented an enormous triangular opening in the center of the face, as shown by the accompanying illustration (Fig. 209). The tongue and larynx were severely involved, and the sight in the left eye was lost. This patient continually wore a gilded silver mask, which covered his deformity and rendered articulation a little less difficult. The saliva continually dribbled from the mouth and from the inferior internal portion of his mask, compelling him to carry some substance to receive the dribblings. Whymper[a] mentions an

Fig. 208.—Gunshot injury of the lower jaw.

Fig. 209.—Gunshot injury of the face.

analogous instance of a gunner who had his whole lower jaw torn away by a shell, but who recovered and used an ingenious contrivance in the shape of a silver mask for remedying the loss of the parts. Steiner[b] mentions a wound from a cannon-ball, which carried away the left half of the inferior maxilla, stripping the soft parts as high as the malar, and on the left side of the neck to within 1½ inches of the clavicle, laying bare the transverse processes of the 2d and 3d vertebræ, and exposing the external carotid and most of its branches.

It sometimes happens that a foreign body, such as the breech of a gun, may be imbedded for some time in the face, with subsequent safe removal. Keith[c] mentions an instance of the successful removal of the breech of a fowling-piece from the face, at the root of the nose, after a lodgment of four months; and Fraser[d] cites an analogous instance in which the breech

[a] 490, 1833. [b] 526, 1849. [c] 548, 1858, 416. [d] 218, 1863, 470.

was imbedded in the bones of the face for eight years. Smith [a] records an instance in which a broken piece of tobacco-pipe penetrated the cheek, remained there for seven months, but was successfully extracted.

Before leaving accidents to the head and neck, a most curious case, cited by O'Neill,[b] will be briefly reviewed. A boy of twelve was entrusted to carry a new iron pot to the destination of its purchaser. Probably to facilitate transportation, the boy removed his hat and placed the pot obliquely on the back part of his head, but a sudden movement caused it to slip forward and downward over the head. Unavailing efforts were made at the time and after he reached home, to remove the pot from his head, but in vain, and he continued all the night greatly prostrated by fright, hunger, and thirst, together with the efforts at removal. The next morning he was taken to a neighboring blacksmith, who, by greasing one of his fingers, managed to insinuate it between the head and pot. Placing the other side of the pot against an anvil, he struck over the location of his finger a quick, heavy tap with a hammer, and the pot fell to pieces. The little patient was much exhausted by all his treatment and want of sleep, and, in fact, could hardly have endured his situation much longer.

[a] 476, 1864, i., 490.

[b] 476, 1889, i., 156.

CHAPTER XI.

SURGICAL ANOMALIES OF THE EXTREMITIES.

Reunion of Digits.—An interesting phenomenon noticed in relation to severed digits is their wonderful capacity for reunion. Restitution of a severed part, particularly if one of considerable function, naturally excited the interest of the older writers. Locher[a] has cited an instance of avulsion of the finger with restitution of the avulsed portion; and Brulet,[b] Van Esh, Farmer,[338] Ponteau, Regnault, and Rosenberg cite instances of reunion of a digit after amputation or severance. Eve's "Remarkable Cases in Surgery" contains many instances of reunion of both fingers and thumbs, and in more recent years several other similar cases have been reported.[c] At the Emergency Hospital in Washington, D. C., there was a boy brought in who had completely severed one of his digits by a sharp bread-cutter. The amputated finger was wrapped up in a piece of brown paper, and, being apparently healthy and the wound absolutely clean, it was fixed in the normal position on the stump, and covered by a bichlorid dressing. In a short time complete function was restored. In this instance no joint was involved, the amputation being in the middle of the 2d phalanx. Staton[d] has described a case in which the hand was severed from the arm by an accidental blow from an axe. The wound extended from the styloid process directly across to the trapezium, dividing all the muscles and blood-vessels, cutting through bones. A small portion of the skin below the articulation, with the ulna, remained intact. After an unavoidable delay of an hour, Staton proceeded to replace the hand with silver sutures, adhesive plaster, and splints. On the third day pulsation was plainly felt in the hand, and on the fourteenth day the sutures were removed. After some time the patient was able to extend the fingers of the wounded member, and finally to grasp with all her wonted strength.

The **reproduction or accidental production of nails** after the original part has been torn away by violence or destroyed by disease, is quite interesting. Sometimes when the whole last phalanx has been removed, the nail regrows at the tip of the remaining stump. Tulpius[342] seems to have met with this remarkable condition. Maréchal de Rougères,[e] Voigtel, and Ormançey[f] have related instances of similar growths on the 2d phalanx

[a] 456, ii., 405. [b] 297, No. 223. [c] 313, Aug., 1865; 224, Jan., 1862.
[d] 604, 1880. [e] 462, T. xxvii., 177. [f] 461, March, 1809.

after the loss of the 1st. For several months a woman had suffered from an ulcer of the middle finger of the right hand, in consequence of a whitlow; there was loss of the 3d phalanx, and the whole of the articular surface and part of the compact bony structure of the 2d. On examining the sore, Ormancey saw a bony sequestrum which appeared to keep it open. He extracted this, and, until cicatrization was complete, he dressed the stump with saturnine cerate. Some months afterward Ormançey saw with astonishment that the nail had been reproduced; instead of following the ordinary direction, however, it lay directly over the face of the stump, growing from the back toward the palmar aspect of the stump digit, as if to cover and protect the stump. Blandin has observed a case of the same description.[a] A third occurred at the Hôpital de la Charité, in a woman, who, in consequence of a whitlow, had lost the whole of the 3d phalanx of one of the forefingers. The soft and fleshy cushion which here covered the 2d phalanx was terminated by a small, blackish nail, like a grain of spur rye. It is probable that in these cases the soft parts of the 3d phalanx, and especially the ungual matrix, had not been wholly destroyed. In his lectures Chevalier speaks of analogous cases.

In some instances **avulsion of a finger** is effected in a peculiar manner. In 1886 Anche reported to his confrères in Bordeaux a rare accident of this nature that occurred to a carpenter. The man's finger was caught between a rope and the block of a pulley. By a sudden and violent movement on his part he disengaged the hand but left the 3d finger attached to the pulley. At first examination the wound looked like that of an ordinary amputation by the usual oval incision; from the center of the wound the proximal fragment of the 1st phalanx projected. Polaillon[b] has collected 42 similar instances, in none of which, however, was the severance complete.

It occasionally happens that in avulsion of the finger an entire tendon is stripped up and torn off with the detached member. Vogel[c] describes an instance of this nature, in which the long flexor of the thumb was torn off with that digit. In the Surgical Museum at Edinburgh there is preserved a thumb and part of the flexor longus pollicis attached, which were avulsed simultaneously. Nunnely[d] has seen the little finger together with the tendon and body of the longer flexor muscle avulsed by machinery. Stone[e] details the description of the case of a boy named Lowry, whose left thumb was caught between rapidly twisting strands of a rope, and the last phalanx, the neighboring soft parts, and also the entire tendon of the flexor longus pollicis were instantly torn away. There was included even the tendinous portion of that small slip of muscle taking its origin from the anterior aspect of the head and upper portion of the ulna, and which is so delicate and insignificant as to

[a] "Anatomie Topographique," p. 558, Paris. [b] Quoted 476, 1886, ii., 641.
[c] Med.-Chir. Beobachtungen, 353. [d] 779, 1859. [e] 124, 1854.

be generally overlooked by anatomists. There was great pain along the course of the tract of abstraction of the tendon.

Pinkerton[a] describes a carter of thirty-one who was bitten on the thumb by a donkey. The man pulled violently in one direction, and the donkey, who had seized the thumb firmly with his teeth, pulled forcibly in the other direction until the tissues gave way and the man ran off, leaving his thumb in the donkey's mouth. The animal at once dropped the thumb, and it was picked up by a companion who accompanied the man to the hospital. On examination the detached portion was found to include the terminal phalanx of the thumb, together with the tendon of the flexor longus pollicis measuring ten inches, about half of which length had a fringe of muscular tissue hanging from the free borders, indicating the extent and the penniform arrangement of the fibers attached to it. Meyer[b] cites a case in which the index finger was torn off and the flexor muscle twisted from its origin. The authors know of an unreported case in which a man running in the street touched his hand to a hitching block he was passing; a ring on one of his fingers caught in the hook of the block, and tore off the finger with the attached tendon and muscle. There is a similar instance of a Scotch gentleman who slipped, and, to prevent falling, he put out his hand to catch the railing. A ring on one of his fingers became entangled in the railing and the force of the fall tore off the soft parts of the finger together with the ring.

The older writers mentioned as a curious fact that **avulsion of the arm,** unaccompanied by hemorrhage, had been noticed. Belchier,[629] Carmichael,[524] and Clough[c] report instances of this nature, and, in the latter case, the progress of healing was unaccompanied by any uncomfortable symptoms. In the last century Hunczoysky observed complete avulsion of the arm by a cannon-ball, without the slightest hemorrhage. The Ephemerides contains an account of the avulsion of the hand without any bleeding, and Woolcomb[d] has observed a huge wound of the arm from which hemorrhage was similarly absent. Later observations have shown that in this accident absence of hemorrhage is the rule and not the exception. The wound is generally lacerated and contused and the mouths of the vessels do not gape, but are twisted and crushed. The skin usually separates at the highest point and the muscles protrude, appearing to be tightly embraced and almost strangulated by the skin, and also by the tendons, vessels, and nerves which, crushed and twisted with the fragments of bone, form a conical stump. Cheselden reports the history of a case, which has since become classic, that he observed in St. Thomas' Hospital in London, in 1837. A miller had carelessly thrown a slip-knot of rope about his wrist, which became caught in a revolving cog, drawing him from the ground and violently throwing his body against a beam. The force exerted by the cog drawing on the rope was sufficient to avulse his whole arm and shoulder-blade. There was comparatively little hemorrhage

[a] 381, 1887, 43. [b] 701, 1879. [c] 564, iii. [d] 629, lx.

and the man was insensible to pain; being so dazed and surprised he really was unconscious of the nature of his injury until he saw his arm in the wheel.

According to Billroth the avulsion of an arm is usually followed by fatal shock. Fischer, however, relates the case of a lion-tamer whose whole left arm was torn from the shoulder by a lion; the loss of blood being very slight and the patient so little affected by shock that he was able to walk to the hospital.

Mussey[a] describes a boy of sixteen who had his left arm and shoulder-blade completely torn from his body by machinery. The patient became so involved in the bands that his body was securely fastened to a drum, while his legs hung dangling. In this position he made about 15 revolutions around the drum before the motion of the machinery could be effectually stopped by cutting off the water to the great wheel. When he was disentangled from the bands and taken down from the drum a huge wound was seen at the shoulder, but there was not more than a pint of blood lost. The collar-bone projected from the wound about half an inch, and hanging from the wound were two large nerves (probably the median and ulnar) more than 20 inches long. He was able to stand on his feet and actually walked a few steps; as his frock was opened, his arm, with a clot of blood, dropped to the floor. This boy made an excellent recovery. The space between the plastered ceiling and the drum in which the revolutions of the body had taken place was scarcely 7½ inches wide. Horsbeck's case was of a negro of thirty-five who, while pounding resin on a 12-inch leather band, had his hand caught between the wheel and band. His hand, forearm, arm, etc., were rapidly drawn in, and he was carried around until his shoulder came to a large beam, where the body was stopped by resistance against the beam, fell to the floor, and the arm and scapula were completely avulsed and carried on beyond the beam. In this case, also, the man experienced little pain, and there was comparatively little hemorrhage. Maclean[b] reports the history of an accident to a man of twenty-three who had both arms caught between a belt and the shaft while working in a woolen factory, and while the machinery was in full operation. He was carried around the shaft with great velocity until his arms were torn off at a point about four inches below the shoulder-joint on each side. The patient landed on his feet, the blood spurting from each brachial artery in a large stream. His fellow-workmen, without delay, wound a piece of rope around each bleeding member, and the man recovered after primary amputation of each stump. Will[c] gives an excellent instance of avulsion of the right arm and scapula in a girl of eighteen, who was caught in flax-spinning machinery. The axillary artery was seen lying in the wound, pulsating feebly, but had been efficiently closed by the torsion of the machinery. The girl recovered.

Additional cases of avulsion of the upper extremity are reported by

[a] 124, 1837, xxi., 385. [b] 632, 1880. [c] 224, 1884, i., 1135.

Aubinais,[a] Bleynie,[b] Charles,[c] George,[d] James,[e] Jones,[f] Marcano,[g] Belchier,[575] Braithwaite,[h] and Hendry.[i]

Avulsion of the Lower Extremity.—The symptoms following avulsion of the upper extremity are seen as well in similar accidents to the leg and thigh, although the latter are possibly the more fatal. Horlbeck[j] quotes Benomont's description of a small boy who had his leg torn off at the knee by a carriage in motion; the child experienced no pain, and was more concerned about the punishment he expected to receive at home for disobedience than about the loss of his leg. Carter[k] speaks of a boy of twelve who incautiously put the great toe of his left foot against a pinion wheel of a mill in motion. The toe was fastened and drawn into the mill, the leg following almost to the thigh. The whole left leg and thigh, together with the left side of the scrotum, were torn off; the boy died as a result of his injuries.

Ashhurst reported to the Pathological Society of Philadelphia the case of a child of nine who had its right leg caught in the spokes of a carriage wheel. The child was picked up unconscious, with its thigh entirely severed, and the bone broken off about the middle third; about three inches higher the muscles were torn from the sheaths and appeared as if cut with a knife. The great sciatic nerve was found hanging 15 inches from the stump, having given way from its division in the popliteal space. The child died in twelve hours. One of the most interesting features of the case was the rapid cooling of the body after the accident and prolongation of the coolness with slight variations until death ensued. Ashhurst remarks that while the cutaneous surface of the stump was acutely sensitive to the touch, there was no manifestation of pain evinced upon handling the exposed nerve.

With reference to **injuries to the sciatic nerve,** Küster[l] mentions the case of a strong man of thirty, who in walking slipped and fell on his back. Immediately after rising to his feet he felt severe pain in the right leg and numbness in the foot. He was unable to stand, and was carried to his house, where Küster found him suffering great pain. The diagnosis had been fracture of the neck of the femur, but as there was no crepitation and passive movements caused but little pain, Küster suspected rupture of the sciatic nerve. The subsequent history of the case confirmed this diagnosis. The patient was confined to bed six weeks, and it was five months afterward before he was able to go about, and then only with a crutch and a stick.

Park[m] mentions an instance of rupture of the sciatic nerve caused by a patient giving a violent lurch during an operation at the hip-joint.

The instances occasionally observed of **recovery of an injured leg after**

[a] Soc. Acad. Loire inf., 1862. [b] 673, 1867–8, i., 11. [c] 476, 1872, i., 216.
[d] 315, 1879, xxxix., 69. [e] 180, 1868, xiii., 117. [f] 224, 1870, i., 545.
[g] 242, 1875, 228. [h] 490, 1832. [i] 299, 1875. [j] 264, 1859, 433.
[k] 528, 1792, ii., 17. [l] 199, March 26, 1883. [m] 450, 1884, 323.

extensive severance and loss of substance are most marvelous. Morton[a] mentions a boy of sixteen, who was struck by one of the blades of a reaping machine, and had his left leg cut through about 1¼ inches above the ankle-joint. The foot was hanging by the portion of skin corresponding to the posterior quarter of the circumference of the leg, together with the posterior tibial vessels and nerves. These were the only structures escaping division, although the ankle-joint itself was intact. There was comparatively little hemorrhage and no shock; a ligature was applied to the vessels, the edges of the wound were drawn together by wire sutures, and the cut surfaces of the tibia were placed in as good apposition as possible, although the lower fragment projected slightly in front of the upper. The wound was dressed and healing progressed favorably; in three months the wound had filled up to such an extent that the man was allowed to go on crutches. The patient was discharged in five months, able to walk very well, but owing to the loss of the function of the extensor tendons the toes dragged.

Washington[b] reports in full the case of a boy of eleven, who, in handing a fowling piece across a ditch, was accidentally shot. The contents of the gun were discharged through the leg above the ankle, carrying away five-sixths of the structure—at the time of the explosion the muzzle of the gun was only two feet away from his leg. The portions removed were more than one inch of the tibia and fibula (irregular fractures of the ends above and below), a corresponding portion of the posterior tibial muscle, and the long flexors of the great and small toes, as well as the tissue interposed between them and the Achilles tendon. The anterior tibial artery was fortunately uninjured. The remaining portions consisted of a strip of skin two inches in breadth in front of the wound, the muscles which it covered back of the wound, the Achilles tendon, and another piece of skin, barely enough to cover the tendon. The wound was treated by a bran-dressing, and the limb was saved with a shortening of but 1½ inches.

There are several **anomalous injuries** which deserve mention. Markoe[c] observed a patient of seventy-two, who ruptured both the quadriceps tendons of each patella by slipping on a piece of ice, one tendon first giving way, and followed almost immediately by the other. There was the usual depression immediately above the upper margin of the patella, and the other distinctive signs of the accident. In three months both tendons had united to such an extent that the patient was able to walk slowly. Gibney[d] records a case in which the issue was not so successful, his patient being a man who, in a fall ten years previously, had ruptured the right quadriceps tendon, and four years later had suffered the same accident on the opposite side. As a result of his injuries, at the time Gibney saw him, he had completely lost all power of extending the knee-joint. Partridge[e] mentions an instance, in a

[a] 476, 1873. [b] 124, 1877, i., 332. [c] 597, 1884.
[d] 597, Dec. 29, 1884. [e] 548, 1868, i., 175.

strong and healthy man, of rupture of the tendon of the left triceps cubiti, caused by a fall on the pavement. There are numerous cases in which the tendo Achillis has recovered after rupture,—in fact, it is unhesitatingly severed when necessity demands it, sufficient union always being anticipated. None of these cases of rupture of the tendon are unique, parallel instances existing in medical literature in abundance.

Marshall[a] had under his observation a case in which the femoral artery was ruptured by a cart-wheel passing over the thigh, and death ensued although there were scarcely any external signs of contusion and positively no fracture. Boerhaave cites a curious instance in which a surgeon attempted to stop hemorrhage from a wounded radial artery by the application of a caustic, but the material applied made such inroads as to destroy the median artery and thus brought about a fatal hemorrhage.

Spontaneous fractures are occasionally seen, but generally in advanced age, although muscular action may be the cause. There are several cases on record in which the muscular exertion in throwing a stone or ball, or in violently kicking the leg, has fractured one or both of the bones of an extremity. In old persons intracapsular fracture may be caused by such a trivial thing as turning in bed, and even a sudden twist of the ankle has been sufficient to produce this injury. In a boy of thirteen Storrs[b] has reported fracture of the femur within the acetabulum. In addition to the causes enumerated, inflammation of osseous tissue, or osteoid carcinoma, has been found at the seat of a spontaneous fracture.

One of the most interesting subjects in the history of surgery is the gradual **evolution of the rational treatment of dislocations.** Possibly no portion of the whole science was so backward as this. Thirty-five centuries ago Darius, son of Hydaspis, suffered a simple luxation of the foot; it was not diagnosed in this land of Apis and of the deified discoverer of medicine. Among the wise men of Egypt, then in her acme of civilization, there was not one to reduce the simple luxation which any student of the present day would easily diagnose and successfully treat. Throughout the dark ages and down to the present century, the hideous and unnecessary apparatus employed, each decade bringing forth new types, is abundantly pictured in the older books on surgery; in some almost recent works there are pictures of windlasses and of individuals making superhuman efforts to pull the luxated member back—all of which were given to the student as advisable means of treatment.

Relative to **anomalous dislocations** the field is too large to be discussed here, but there are two recent ones worthy of mention. Bradley[c] relates an instance of death following a subluxation of the right humerus backward on the scapula. It could not be reduced because the tendon of the biceps lay between the head of the humerus and a piece of the bone which was chipped off.

[a] 224, 1870, ii., 116. [b] 656, 1843. [c] 224, 1877, i., 544.

Baxter-Tyrie[a] reports a dislocation of the shoulder-joint, of unusual origin, in a man who was riding a horse that ran away up a steep hill. After going a few hundred yards the animal abated its speed, when the rider raised his hand to strike. Catching sight of the whip, the horse sprang forward, while the man felt an acute pain and a sense of something having given way at his shoulder. He did not fall off, but rode a little further and was helped to dismount. On examination a subcoracoid dislocation of the head of the humerus was found. The explanation is that as the weight of the whip was inconsiderable (four ounces) the inertia of the arm converted it into a lever of the first order. Instead of fulfilling its normal function of preventing displacement, the coraco-acromial arch acted as a fulcrum. The limb from the fingers to that point acted as the "long arm," and the head and part of the neck of the humerus served as the "short arm." The inertia of the arm, left behind as it were, supplied the power, while the ruptured capsular ligament and displacement of the head of the bone would represent the work done.

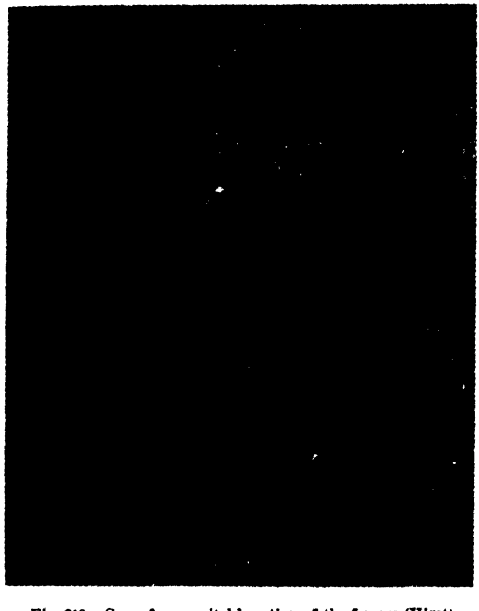


Fig. 210.—Case of congenital luxation of the femora (Hirst).

Congenital Dislocations.—The extent and accuracy of the knowledge possessed by Hippocrates on the subject of congenital dislocations have excited the admiration of modern writers, and until a comparatively recent time examples of certain of the luxations described by him had not been recorded. With regard, for instance, to congenital dislocations at the shoulder-joint, little or nothing was known save what was contained in the writings of Hippocrates, till R. M. Smith and Guérin discussed the lesion in their works.

Among congenital dislocations, those of the hips are most common—in fact, 90 per cent. of all. They are sometimes not recognizable until after the lapse of months and sometimes for years, but their causes—faulty developments of the joint, paralysis, etc.—are supposed to have existed at birth. One or both joints may be involved, and according to the amount of involvement the gait is peculiar. As to the reduction of such a dislocation, the most that

[a] 476, No. 3767, 1165.

can be done is to diminish the deformity and functional disability by traction and palliative measures with apparatus. The normal structure of the joint does not exist, and therefore the dislocation admits of no reduction. Congenital dislocations of the shoulder are also seen, owing to faulty development of the glenoid fossa; and at the knee, the leg generally being in extreme hyperextension, the foot sometimes resting on the abdomen. Congenital luxation of the femora, when it appears in adult women (Fig. 210) is a prominent factor in dystocia. There is a dislocation found at birth, or occurring shortly after, due to dropsy of the joint in utero; and another form due to succeeding paralysis of groups of muscles about the joint.

The interesting instances of **major amputations** are so numerous and so well known as to need no comment here. **Amputation of the hip** with recovery is fast becoming an ordinary operation; at Westminster Hospital in London, there is preserved the right humerus and scapula, presenting an enormous bulk, which was removed by **amputation at the shoulder-joint,** for a large lymphosarcoma growing just above the clavicle. The patient was a man of twenty-two, and made a good recovery. Another similar preparation is to be seen in London at St. Bartholomew's Hospital.

Simultaneous, synchronous, or consecutive amputations of all the limbs have been repeatedly performed. Champenois[a] reports the case of a Sumatra boy of seven, who was injured to such an extent by an explosion as to necessitate the amputation of all his extremities, and, despite his tender age and the extent of his injuries, the boy completely recovered. Jackson, quoted by Ashhurst,[b] had a patient from whom he simultaneously amputated all four limbs for frost-bite.

Muller[c] reports a case of amputation of all four limbs for frost-bite, with recovery. The patient, aged twenty-six, while traveling to his home in Northern Minnesota, was overtaken by a severe snow storm, which continued for three days; on December 13th he was obliged to leave the stage in a snow-drift on the prairie, about 110 miles distant from his destination. He wandered over the prairie that day and night, and the following four days, through the storm, freezing his limbs, nose, ears, and cheeks, taking no food or water until, on December 16th, he was found in a dying condition by Indian scouts, and taken to a station-house on the road. He did not reach the hospital at Fort Ridgely until the night of December 24th—eleven days after his first exposure. He was almost completely exhausted, and, after thawing the ice from his clothes, stockings, and boots,—which had not been removed since December 13th,—it was found that both hands and forearms were completely mortified up to the middle third, and both feet and legs as far as the upper third; both knees over and around the patellæ, and the alæ and tip of the nose all presented a dark bluish appearance and fairly circumscribed swelling. No evacuation of the bowels had taken place for over two weeks,

[a] 662, 1869, 507. [b] 174, 107. [c] 847, 216.

and as the patient suffered from singultus and constant pain over the epigastric region, a light cathartic was given, which, in twenty-four hours, gave relief. The four frozen limbs were enveloped in a solution of zinc chlorid. The frozen ears and cheeks healed in due time, and the gangrenous parts of the nose separated and soon healed, with the loss of the tip and parts of the alæ, leaving the septum somewhat exposed. On January 10th the lines of demarcation were distinct and deep on all four limbs, though the patient, seconded by his wife, at first obstinately opposed operative interference; on January 13th, after a little hesitancy, the man consented to an amputation of the arms. This was successfully carried out on both forearms, at the middle third, the patient losing hardly any blood and complaining of little pain. The great relief afforded by this operation so changed his aversion to being operated upon that on the next day he begged to have both legs amputated in the same manner, which was done, three days afterward, with the same favorable result. After some minor complications the patient left for his home, perfectly recovered, June 9, 1866.

Begg of Dundee[a] successfully performed quadruple amputation on a woman, the victim of idiopathic gangrene. With artificial limbs she was able to earn a livelihood by selling fancy articles which she made herself. This woman died in 1885, and the fou· limbs, mounted on a lay figure, were placed in the Royal College of Surgeons, in London. Wallace, of Rock Rapids, Iowa, has successfully removed both forearms, one leg, and half of the remaining foot, for frost-bite. Allen[b] describes the case of a boy of eight who was run over by a locomotive, crushing his right leg, left foot, and left forearm to such an extent as to necessitate **primary triple amputation** at the left elbow, left foot, and right leg, the boy recovering. Ashhurst remarks that Luckie, Alexander, Koehler, Lowman, and Armstrong have successfully removed both legs and one arm simultaneously for frost-bite, all the patients making excellent recoveries in spite of their mutilations; he adds that he himself has successfully resorted to synchronous amputation of the right hip-joint and left leg for a railroad injury occurring in a lad of fifteen, and has twice synchronously amputated three limbs from the same patient, one case recovering.

Wharton[c] reports a case of triple major amputation on a negro of twenty-one, who was run over by a train (Fig. 211). His right leg was crushed at the knee, and the left leg crushed and torn off in the middle third; the right forearm and hand were crushed. In order to avoid chill and exposure, he was operated on in his old clothes, and while one limb was being amputated the other was being prepared. The most injured member was removed first. Recovery was uninterrupted.

There are two cases of **spontaneous amputation** worthy of record. Boerhaave mentions a peasant near Leyden, whose axillary artery was divided

[a] 224, 1886, i., 81. [b] 476, 1889, i., 730. [c] 533, March 31, 1894.

with a knife, causing great effusion of blood, and the patient fainted. The mouth of the vessel was retracted so far as to render ligature impossible, and the poor man was abandoned to what was considered an inevitable fate by his unenlightened attendants. Expecting to die every moment, he continued several days in a languid state, but the hemorrhage ceased spontaneously, and the arm decayed, shrunk, and dried into a mummified stump, which he carried about for quite a while. Rooker [a] speaks of a fracture of the forearm, near the lower part of the middle third, in a patient aged fourteen. Incipient gangrene below the seat of fracture, with associate inflammation, developed; but on account of the increasing gangrene it was determined to amputate. On the fifth day the line of demarcation extended to the spine of the scapula, laying bare the bone and exposing the acromion process and involving the pectoral muscles. It was again decided to let Nature continue her work. The bones exfoliated, the spine and the acromial end of the scapula came away, and a good stump was formed. Figure 212 represents the patient at the age of twenty-eight.

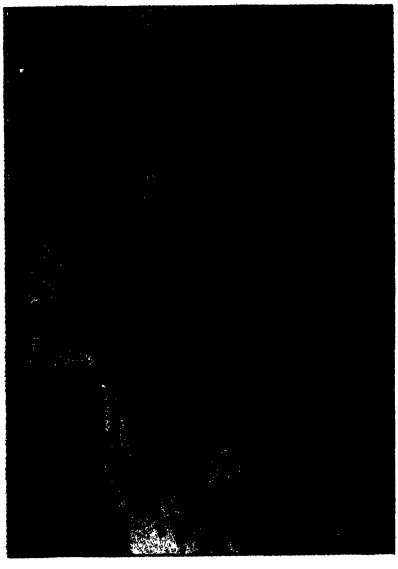


Fig. 211.—Synchronous triple amputation (Wharton).

By ingenious mechanical contrivances persons who have lost an extremity are enabled to perform the ordinary functions of the missing member with but slight deterioration. **Artificial arms, hands, and legs** have been developed to such a degree of perfection that the modern mechanisms of this nature are very unlike the cumbersome and intricate contrivances formerly used.

Fig. 212.—Spontaneous amputation at the shoulder (Rooker).

Le Progrés Médical [b] contains an interesting account of a curious contest held between **dismembered athletes** at Nogent-Sur-Marne, a small town in the Department of the Seine, in France. Responding to a general

[a] 133, 1879, xx., 210.

[b] Quoted 476, 1895, ii., 290.

invitation, no less than seven individuals who had lost either leg or thigh, competed in running races for prizes. The enterprising cripples were divided into two classes: the *cuissards*, or those who had lost a thigh, and *jambards*, or those who had lost a leg; and, contrary to what might have been expected, the grand champion came from the former class. The distance in each race was 200 meters. M. Roullin, whose thigh, in consequence of an accident, was amputated in 1887, succeeded in traversing the course in the remarkable time of thirty seconds (about 219 yards); whereas M. Florrant, the speediest jambard, required thirty-six seconds to run the same distance; and was, moreover, defeated by two other cuissards besides the champion. The junior race was won in thirty-five seconds, and this curious day's sport was ended by a *course de consolation*, which was carried off in thirty-three seconds by M. Mausire, but whether he was a cuissard or a jambard was not stated.

On several occasions in England, cricket matches have been organized between armless and legless men. In Charles Dickens' paper, "All the Year Round," October 5, 1861, there is a reference to a cricket match between a one-armed eleven and a one-legged eleven. There is a recent report from De Kalb, Illinois, of a boy of thirteen who had lost both legs and one arm, but who was nevertheless enabled to ride a bicycle specially constructed for him by a neighboring manufacturer. With one hand he guided the handle bar, and bars of steel attached to his stumps served as legs. He experienced no trouble in balancing the wheel; it is said that he has learned to dismount, and soon expects to be able to mount alone; although riding only three weeks, he has been able to traverse one-half a mile in two minutes and ten seconds. While the foregoing instance is an exception, it is not extraordinary in the present day to see persons with artificial limbs riding bicycles, and even in Philadelphia, May 30, 1896, there was a special bicycle race for one-legged contestants.

The instances of interesting cases of **foreign bodies in the extremities** are not numerous. In some cases the foreign body is tolerated many years in this location. There are to-day many veterans who have bullets in their extremities. Girdwood[a] speaks of the removal of a foreign body after twenty-five years' presence in the forearm. Pike[b] mentions a man in India, who, at the age of twenty-two, after killing a wounded hare in the usual manner by striking it on the back of the neck with the side of the hand, noticed a slight cut on the hand which soon healed but left a lump under the skin. It gave him no trouble until two months before the time of report, when he asked to have the lump removed, thinking it was a stone. It was cut down upon and removed, and proved to be the spinous process of the vertebra of a hare. The bone was living and healthy and had formed a sort of arthrodial joint on the base of the phalanx of the little finger and had remained in this position for nearly twenty-two years.

[a] 251, 1866. [b] 224, 1889, ii., 1331.

White[a] has described a case in which a nail broken off in the foot, separated into 26 splinters, which, after intense suffering, were successfully removed. There was a case recently reported of a man admitted to the Bellevue Hospital, New York, whose arm was supposed to have been fractured by an explosion, but instead of which **11 feet of lead wire** were found in it by the surgeons. The man was a machinist in the employ of the East River Lead Co., and had charge of a machine which converted molten lead into wire. This machine consists of a steel box into which the lead is forced, being pressed through an aperture ⅛ inch in diameter by hydraulic pressure of 600 tons. Reaching the air, the lead becomes hard and is wound on a large wheel in the form of wire. Just before the accident this small aperture had become clogged, and the patient seized the projecting wire in his hand, intending to free the action of the machine, as he had previously done on many occasions, by a sharp, strong pull; but in so doing an explosion occurred, and he was hurled to the floor unconscious. While on the way to the hospital in the ambulance, he became conscious and complained of but little pain except soreness of the left arm about the elbow. The swelling, which had developed very rapidly, made it impossible for the surgeons to make an examination, but on the following day, when the inflammation had subsided sufficiently, a diagnosis of fracture of the bones of the arm was made. There was no external injury of the skin of any magnitude, and the surgeons decided to cut down on the trifling contusion, and remove what appeared to be a fragment of bone, lodged slightly above the wrist. An anesthetic was administered, and an incision made, but to the amazement of the operators, instead of bone, a piece of wire one inch in length and ⅛ inch in diameter was removed. On further exploration piece after piece of the wire was taken out until finally the total length thus removed aggregated 11 feet, the longest piece measuring two feet and the shortest ¼ inch. The wire was found imbedded under the muscles of the arm, and some of it had become wedged between the bones of the forearm. Probably the most-remarkable feature of this curious accident was the fact that there was no fracture or injury to the bone, and it was thought possible that the function of the arm would be but little impaired.

Tousey[b] reports a case of foreign body in the axilla that was taken for a necrotic fragment of the clavicle. The patient was a boy of sixteen, who climbed up a lamp-post to get a light for his bicycle lamp; his feet slipped off the ornamental ledge which passed horizontally around the post about four feet from the ground, and he fell. In the fall a **lead pencil** in his waistcoat pocket caught on the ledge and was driven into the axilla, breaking off out of sight. This was supposed to be a piece of the clavicle, and was only discovered to be a pencil when it was removed six weeks after.

There are several diseases of the bone having direct bearing on the anomalies of the extremities which should have mention here. **Osteomalacia**

[a] 647, 1860. [b] 597, Jan. 12, 1895.

is a disease of the bones in adult life, occurring most frequently in puerperal women, but also seen in women not in the puerperal state, and in men. It is characterized by a progressive softening of the bone-substance, from a gradual absorption of the lime-salts, and gives rise to considerable deformity, and occasionally to spontaneous fracture.

Rachitis or rickets is not a disease of adult life, but of infancy and childhood, and never occurs after the age of puberty. It seldom begins before six months or after three years. There are several theories as to its causation, one being that it is due to an abnormal development of acids. There is little doubt that defective nutrition and bad hygienic surroundings are prominent factors in its production. The principal pathologic change is seen in the epiphyseal lines of long bones and

Fig. 213.—Appearance during life of the highest grade of rachitis: pseudoosteomalacia (Pippingskjöld).

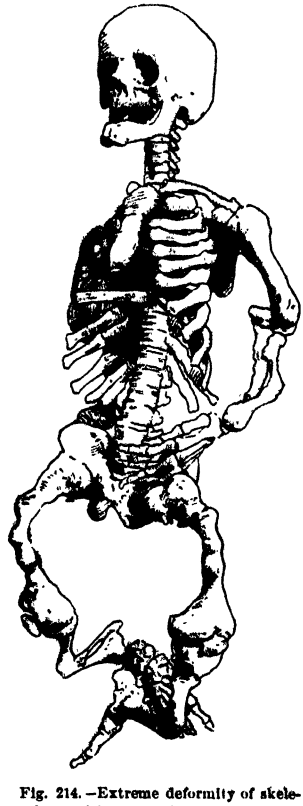


Fig. 214.—Extreme deformity of skeleton due to rickets, showing enlargement of the ends of the bones (Sp. 1545, Warren Museum).

beneath the periosteum. Figure 213 shows the appearance during life of a patient with the highest grade of rachitis, and it can be easily understood what a barrier to natural child-birth it would produce. In rachitis epiphyseal swellings are seen at the wrists and ankle-joints, and in superior cases at the ends of the phalanges of the fingers and toes. When the shaft of a long bone is affected, not only deformity, but even fracture may occur. Under these circumstances the humerus and femur appear to be the bones

most likely to break; there is an associate deformity of the head, known as "craniotabes," together with pigeon-breast and various spinal curvature. The accompanying illustration (Fig. 214) is from a drawing of a skeleton in the Warren Museum in Boston. The subject was an Indian, twenty-one years of age, one of the Six Nations. His mode of locomotion was by a large wooden bowl, in which he sat and moved forward by advancing first one side of the bowl and then the other, by means of his hands. The nodules or "adventitious joints" were the result of imperfect ossification, or, in other words, of motion before ossification was completed.

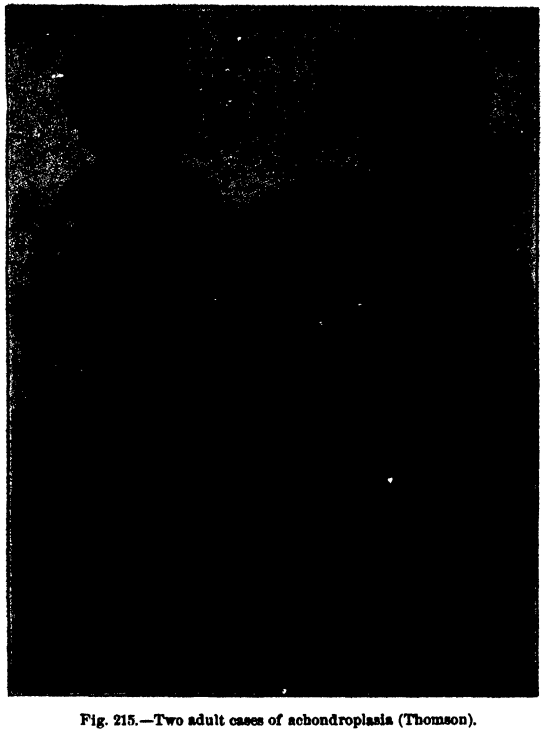


Fig. 215.—Two adult cases of achondroplasia (Thomson).

Analogous to rachitis is **achondroplasia,** or the so-called fetal rickets—a disease in which deformity results from an arrest, absence, or perversion of the normal process of enchondral ossification. It is decidedly an intrauterine affection, and the great majority of fetuses die in utero. Thomson[a] reports three living cases of achondroplasia. The first was a child five months of age, of pale complexion, bright and intelligent, its head measuring 23 inches in length. There was a narrow thorax showing the distinct beads of rickets; the upper and lower limbs were very short, but improved under antirachitic

[a] 318, June, 1893.

treatment. The child died of pneumonia. The other two cases (Fig. 215) were in adults, one thirty-nine and the other thirty-six. The men were the same height, 49 inches, and resembled each other in all particulars. They both enjoyed good health, and, though somewhat dwarfed, were of considerable intelligence. Neither had married. Both the upper and lower limbs showed exaggerations of the normal curves; the hands and feet were broad and short; the gait of both of these little men was waddling, the trunk swaying when they attempted to make any rapid progress.

Osteitis deformans is a hyperplasia of bone described by Paget in 1856. Paget's patient was a gentleman of forty-six who had always enjoyed good health; without assignable cause he began to be subject to aching pains in the thighs and legs. The bones of the left leg began to increase in size, and a year or two later the left femur also enlarged considerably. During a period of twenty years these changes were followed by a growth of other bones. The spine became firm and rigid, the head increased 5¼ inches in circumference. The bones of the face were not affected. When standing, the patient had a peculiar bowed condition of the legs, with marked flexure at the knees. He finally died of osteosarcoma, originating in the left radius. Paget collected eight cases, five of whom died of malignant disease. The postmortem of Paget's case showed extreme thickening in the bones affected, the femur and cranium particularly showing osteosclerosis. Several cases have been recorded in this country; according to Warren, Thieberge analyzed 43 cases; 21 were men, 22 women; the disease appeared usually after forty.

Acromegaly is distinguished from osteitis deformans in that it is limited to hypertrophy of the hands, feet, and face, and it usually begins earlier. In gigantism the so-called "giant growth of bones" is often congenital in character, and is unaccompanied by inflammatory symptoms.

The deformities of the articulations may be congenital but in most cases are acquired. When these are of extreme degree, locomotion is effected in most curious ways. Ankylosis at unnatural angles and even complete reversion of the joints has been noticed. Paré gives a case of reversion, and of crooked hands and feet; and Barlow[a] speaks of a child of two and three-quarter years with kyphosis, but mobility of the lumbar region, which walked on its elbows and knees. The pathology of this deformity is obscure, but there might have been malposition in utero. Wilson presented a similar case before the Clinical Society of London, in 1888. The "Camel-boy," exhibited some years ago throughout the United States, had reversion of the joints, which resembled those of quadrupeds. He walked on all fours, the mode of progression resembling that of a camel.

Figure 216 represents Orloff, "the transparent man," an exhibitionist, showing curious deformity of the long bones and atrophy of the extremities. He derived his name from the remarkable transparency of his deformed members

[a] 476, 1890, ii.

to electric light, due to porosity of the bones and deficiency of the overlying tissues.

Figure 217, taken from Hutchinson's "Archives of Surgery,"[a] represents an extreme case of deformity of the knee-joints in a boy of seven, the result of severe osteoarthritis. The knees and elbows were completely ankylosed.

Fig. 216.—Extreme deformity of the bones and joints.

Fig. 217.—Deformed knee-joints from severe osteoarthritis (Hutchinson).

Infantile spinal paralysis is often the cause of distressing deformities, forbidding locomotion in the ordinary manner. In a paper on the surgical and mechanical treatment of such deformities Willard[b] mentions a boy of fourteen, the victim of infantile paralysis, who at the age of eleven had never walked, but dragged his legs along (Fig. 218). His legs were greatly twisted, and there was flexion at right angles at the hips and knees. There was equinovarus in the left foot and equinovalgus in the right. By an operation of subcutaneous section at the hips, knees, and feet, with application of plaster-

Fig. 218.—Distortion of the joints from infantile spinal paralysis (Willard).

[a] Vol. v., 82.

[b] 124, May, 1891.

of-Paris and extension, this hopeless cripple walked with crutches in two months, and with an apparatus consisting of elastic straps over the quadriceps femoris, peroneals, and weakened muscles, the valgus-foot being supported beneath the sole. In six months he was walking long distances; in one year he moved speedily on crutches. Willard also mentions another case of a girl of eleven who was totally unable to support the body in the erect position, but could move on all fours, as shown in figure 219. There was equino-varus in the right foot and valgus in the left. The left hip was greatly distorted, not only in the direction of flexion, but there was also twisting of the femoral neck, simulating dislocation. This patient was also operated on in the same manner as the preceding one.

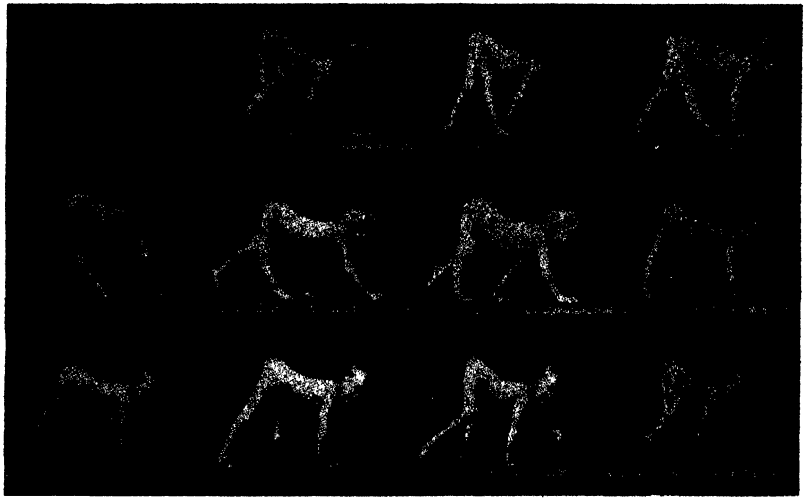


Fig. 219.—Mode of locomotion in a case of deformity from infantile spinal paralysis (Willard).

Relative to **anomalous increase or hypertrophy of the bones of the extremities,** Fischer shows that an increase in the length of bone may follow slight injuries. He mentions a boy of twelve, who was run over by a wagon and suffered a contusion of the bones of the right leg. In the course of a year this leg became 4½ cm. longer than the other, and the bones were also much thicker than in the other. Fischer also reports several cases of abnormal growth of bone following necrosis. A case of shortening 3¾ cm., after a fracture, was reduced to one cm. by compensatory growth. Elongation of the bone is also mentioned as the result of the inflammation of the joint. Warren also quotes Taylor's case of a lady who fell, injuring, but not fracturing, the thigh. Gradual enlargement, with an outward curving of the bone, afterward took place.

CHAPTER XII.

SURGICAL ANOMALIES OF THE THORAX AND ABDOMEN.

Injuries of the lung or bronchus are always serious, but contrary to the general idea, recovery after extensive wound of the lung is quite a common occurrence. Even the older writers report many instances of remarkable recoveries from lung-injuries, despite the primitive and dirty methods of treatment. A review of the literature previous to this century shows the names of Arcæus, Brunner, Collomb, Fabricius Hildanus, Vogel, Rhodius, Petit, Guérin, Köler, Peters, Flebbe, and Stalpart,[750] as authorities for instances of this nature. In one of the journals[108] there is a description of a man who was wounded by a broad-sword thrust in the mediastinum. After death it was found that none of the viscera were wounded, and death was attributed to the fact that the in-rush of air counterbalancing the pressure within the lungs left them to their own contractile force, with resultant collapse, obstruction to the circulation, and death. It is said that Vesalius demonstrated this condition on the thorax of a pig.

Gooch[882] gives an instance of a boy of thirteen who fell from the top of a barn upon the sharp prow of a plough, inflicting an oblique wound from the axilla to below the sternum, slightly above the insertion of the diaphragm. Several ribs were severed, and the left thoracic cavity was wholly exposed to view, showing the lungs, diaphragm, and pericardium all in motion. The lungs soon became gangrenous, and in this horrible state the patient lived twelve days. One of the curious facts noticed by the ancient writers was the amelioration of the symptoms caused by thoracic wounds after hemorrhage from other locations; and naturally, in the treatment of such injuries, this circumstance was used in advocacy of depletion. Monro speaks of a gentleman who was wounded in a duel, and who had all the symptoms of hemothorax; his condition was immediately relieved by the evacuation of a considerable quantity of bloody matter with the urine. Swammerdam records a similar case, and Fabricius ab Aquapendente noticed a case in which the opening in the thorax showed immediate signs of improvement after th patient voided large quantities of bloody urine. Glandorp also calls attention to the foregoing facts. Nicolaus Novocomensis narrates the details of the case of one of his friends, suffering from a penetrating wound of the

thorax, who was relieved and ultimately cured by a bloody evacuation with the stool.

There is an extraordinary recovery reported [a] in a boy of fifteen who, by falling into the machinery of an elevator, was severely injured about the chest. There were six extensive lacerations, five through the skin about six inches long, and one through the chest about eight inches long. The 3d, 4th, 5th, and 6th ribs were fractured and torn apart, and about an inch of the substance of the 4th rib was lost. Several jagged fragments were removed; a portion of the pleura, two by four inches, had been torn away, exposing the pericardium and the left lung, and showing the former to have been penetrated and the latter torn. The lung collapsed completely, and for three or four months no air seemed to enter it, but respiration gradually returned. The lacerated integument could only be closed approximately by sutures. It is worthy of remark that, although extremely pale, the patient complained of but little pain, and exhibited only slight symptoms of shock. The pleural cavity subsequently filled with a dirty serum, but even this did not interfere with the healing of the wound and the restoration of the lung; the patient recovered without lateral curvature.

Bartholf reports a case of rapid recovery after perforating wound of the lung. The pistol-ball entered the back 1½ inches to the right of the spinous process of the 6th dorsal vertebra, and passed upward and very slightly inward toward the median line. Its track could be followed only 1¼ inches. Emphysema appeared fifteen minutes after the reception of the wound, and soon became pronounced throughout the front and side of the neck, a little over the edge of the lower jaw, and on the chest two inches below the sternum and one inch below the clavicle. In four hours respiration became very frequent, short, and gasping, the thoracic walls and the abdomen scarcely moving. The man continued to improve rapidly, the emphysema disappeared on the seventh day, and eighteen days after the reception of the wound he was discharged. There was slight hemorrhage from the wound at the time, but the clot dried and closed the wound, and remained there until it was removed on the morning of his discharge, leaving a small, dry, white cicatrix.

Loss of Lung-tissue.—The old Amsterdam authority, Tulpius,[842] has recorded a case in which a piece of lung of about three fingers' breadth protruded through a large wound of the lung under the left nipple. This wound received no medical attention for forty-eight hours, when the protruding portion of lung was thought to be dead, and was ligated and cut off; it weighed about three ounces. In about two weeks the wound healed with the lung adherent to it and this condition was found six years later at the necropsy of this individual. Tulpius quoted Celsus and Hippocrates as authorities for the surgical treatment of this case. In 1787 Bell gave an account of a case in which a large portion of the lung protruded and was strangulated by the

[a] Annual of the Universal Medical Sciences, 1892.

edges of the thoracic wound, yet the patient made a good recovery. Fabricius Hildanus[334] and Ruysch[699] record instances of recovery in which large pieces of lung have been cut off; and it is said that with General Wolfe at Quebec there was another officer who was shot through the thorax and who recovered after the removal of a portion of the lung. In a letter to one of his medical friends Roscius says that he succeeded in cutting off part of a protruding, livid, and gangrenous lung, after a penetrating wound of the chest, with a successful result. Hale[a] reports a case of a penetrating stab-wound in which a piece of lung was removed from a man of twenty-five.

Tait[b] claims that **surgical treatment**, as exemplified by Biondi's experiment in removing portions of lung from animals, such as dogs, sheep, cats, etc., is not practical; he adds that his deductions are misleading, as the operation was done on healthy tissue and in deep and narrow-chested animals. **Excision of diseased portions of the lung** has been practised by Krönlein (three cases), Ruggi of Bologna (two cases), Block, Milton, Weinlechner; one of Krönlein's patients recovered and Milton's survived four months, but the others promptly succumbed after the operation. Tuffier[c] is quoted as showing a patient, aged twenty-nine, upon whom, for beginning tuberculosis, he had performed pneumonectomy four years before. At the operation he had removed the diseased area at the apex of the right lung, together with sound tissue for two cm. in every direction. Tuffier stated that the result of his operation had been perfectly successful and the patient had shown no suspicious symptoms since.

Rupture of the Lung Without Fracture.—It is quite possible for the lung to be ruptured by external violence without fracture of the ribs; there are several such cases on record. The mechanism of this rare and fatal form of injury has been very aptly described by Gosselin as due to a sudden pressure exerted on the thoracic wall at the moment of full inspiration, there being a spasm of the glottis or obstruction of the larynx, in consequence of which the lung bursts. An extravasation of air occurs, resulting in the development of emphysema, pneumothorax, etc. Subsequently pleurisy, pneumonia, or even pus in the pleural cavity often result. Hemoptysis is a possible, but not a marked symptom. The mechanism is identical with that of the bursting of an inflated paper bag when struck by the hand. Other observers discard this theory of M. Gosselin and claim that the rupture is due to direct pressure, as in the cases in which the heart is ruptured without fracture of the ribs. The theory of Gosselin would not explain these cardiac ruptures from external violence on the thoracic walls, and, therefore, was rejected by some. Paré, Morgagni, Portal, Hewson Smith, Dupuytren, Laennec, and others mention this injury. Gosselin reports two cases terminating in recovery. Ashhurst reports having seen three cases, all of which terminated fatally before the fifth day; he has collected the histories of 39

[a] 526, 1851. [b] 224, 1884, i., 1178. [c] 533, Nov. 23, 1895.

cases, of which 12 recovered. Otis has collected reports of 25 cases of this form of injury from military practice exclusively. These were generally caused by a blow on the chest, by a piece of shell, or other like missile. Among the 25 cases there were 11 recoveries. As Ashhurst very justly remarks, this injury appears more fatal in civil than in military life.

Pyle[a] reports a case successfully treated, as follows :—

"Lewis W., ten years old, white, born in Maryland, and living now in the District of Columbia, was brought in by the Emergency Hospital ambulance, on the afternoon of November 10th, with a history of having been run over by a hose-cart of the District Fire Department. The boy was in a state of extreme shock, having a weak, almost imperceptible pulse; his respirations were shallow and rapid, and his temperature subnormal. There were no signs of external injury about his thoracic cavity and no fracture of the ribs could be detected, although carefully searched for; there was marked emphysema; the neck and side of the face were enormously swollen with the extravasated air; the tissues of the left arm were greatly infiltrated with air, which enabled us to elicit the familiar crepitus of such infiltration when an attempt at the determination of the radial pulse was made. Consciousness was never lost. There were several injuries to the face and scalp; and there was hemorrhage from the nose and mouth, which was attributed to the fact that the patient had fallen on his face, striking both nose and lip. This was confirmed subsequently by the absence of any evidences of hemoptysis during the whole period of convalescence. The saliva was not even blood-streaked; therefore, it can be said with verity that there was no hemoptysis. Shortly after admission the patient reacted to the stimulating treatment, his pulse became stronger, and all evidences of threatened collapse disappeared. He rested well the first night and complained of no pain, then or subsequently. The improvement was continuous. The temperature remained normal until the evening of the fifth day, when it rose to 102.2°, and again, on the evening of the sixth, to 102.3°. This rise was apparently without significance as the patient at no time seemed disturbed by it. On the eighth day the temperature again reached the normal and has since remained there. The boy is apparently well now, suffers no inconvenience, and has left the hospital, safe from danger and apparently free from any pulmonary embarrassment. He uses well-developed diaphragmatic breathing which is fully sufficient."

Pollock[b] reports the case of a boy of seven, whose lung was ruptured by a four-wheeled cab which ran over him. He was discharged well in thirty-two days. Bouilly[c] speaks of recovery in a boy of seventeen, after a rupture of the lung without fracture. There are several other interesting cases of recovery on record.

There are instances of **spontaneous rupture of the lung,** from severe cough. Hicks[d] speaks of a child of ten months suffering with a severe cough

[a] 533, Feb. 24, 1894. [b] 700, 1877–8, 246. [c] 368, Oct. 15, 1881. [d] 490, April 22, 1837, 119.

resembling pertussis, whose lung ruptured about two weeks after the beginning of the cough, causing death on the second day. Ferrari [a] relates a curious case of rupture of the lung from deep inspiration.

Complete penetration or transfixion of the thoracic cavity is not necessarily fatal, and some marvelous instances of recovery after injuries of this nature, are recorded. Eve [b] remarks that General Shields was shot through the body by a discharge of a cannon at Cerro Gordo, and was given up as certain to die. The General himself thought it was grape-shot that traversed his chest. He showed no signs of hemoptysis, and although in great pain, was able to give commands after reception of the wound. In this case, the ball had evidently entered within the right nipple, had passed between the lungs, through the mediastinum, emerging slightly to the right of the spine. Guthrie [c] has mentioned a parallel instance of a ball traversing the thoracic cavity, the patient completely recovering after treatment. Girard, Weeds, Meacham, Bacon, Fryer and others [d] report cases of perforating gunshot wounds of the chest with recovery.

Sewell [e] describes a case of transfixion of the chest in a youth of eighteen. After mowing and while carrying his scythe home, the patient accidentally fell on the blade; the point passed under the right axilla, between the 3d and 4th right ribs, horizontally through the chest, and came out through corresponding ribs of the opposite side, making a small opening. He fell to the ground and lay still until his brother came to his assistance; the latter with great forethought and caution carefully calculated the curvature of the scythe blade, and thus regulating his direction of tension, successfully withdrew the instrument. There was but little hemoptysis and the patient soon recovered. Chelius [f] records an instance of penetration of the chest by a carriage shaft, with subsequent recovery. Hoyland [g] mentions a man of twenty-five who was discharging bar-iron from the hold of a ship; in a stooping position, preparatory to hoisting a bundle on deck, he was struck by one of the bars which pinned him to the floor of the hold, penetrating the thorax, and going into the wood of the flooring to the extent of three inches, requiring the combined efforts of three men to extract it. The bar had entered posteriorly between the 9th and 10th ribs of the left side, and had traversed the thorax in an upward and outward direction, coming out anteriorly between the 5th and 6th ribs, about an inch below and slightly external to the nipple. There was little constitutional disturbance, and the man was soon discharged cured. Brown [h] records a case of impalement in a boy of fourteen. While running to a fire, he struck the point of the shaft of a carriage, which passed through his left chest, below the nipple. There was, strangely, no hemorrhage, and no symptoms of so severe an injury; the boy recovered.

There is deposited in the Museum of the Royal College of Surgeons in

[a] 659, 1855. [b] 744, 1848. [c] 476, 1853. [d] 847, 27 et seq. [e] 124, 1849.
[f] 265, i. [g] 491, 1863, ii., 241. [h] Trans. Med. Soc. Pa., 1877, pt. 2, 730.

London, a mast-pivot, 15 inches in length and weighing between seven and eight pounds, which had passed obliquely through the body of a sailor. The specimen is accompanied by a colored picture of the sufferer himself in two positions. The name of the sailor was Taylor, and the accident occurred aboard a brig lying in the London docks. One of Taylor's mates was guiding the pivot of the try-sail into the main boom, when a tackle gave way. The pivot instantly left the man's hand, shot through the air point downward, striking Taylor above the heart, passing out lower down posteriorly, and then imbedded itself in the deck. The unfortunate subject was carried at once to the London Hospital, and notwithstanding his transfixion by so formidable an instrument, in five months Taylor had recovered sufficiently to walk, and ultimately returned to his duties as a seaman.

In the same museum, near to this spike, is the portion of a shaft of the carriage which passed through the body of a gentleman who happened to be standing near the vehicle when the horse plunged violently forward, with the result that the off shaft penetrated his body under the left arm, and came out from under the right arm, pinning the unfortunate man to the stable door. Immediately after the accident the patient walked upstairs and got in bed; his recovery progressed uninterruptedly, and his wounds were practically healed at the end of nine weeks; he is reported to have lived eleven years after this terrible accident.

In the Indian Medical Gazette[a] there is an account of a private of thirty-five, who was thrown forward and off his horse while endeavoring to mount. He fell on a lance which penetrated his chest and came out through the scapula. The horse ran for about 100 yards, the man hanging on and trying to stop him. After the extraction of the lance the patient recovered. Longmore[b] gives an instance of complete transfixion by a lance of the right side of the chest and lung, the patient recovering. Ruddock[c] mentions cases of penetrating wounds of both lungs with recovery.

There is a most remarkable instance of **recovery after major thoracic wounds** recorded by Brokaw.[d] In a brawl, a shipping clerk received a thoracic wound extending from the 3d rib to within an inch of the navel, 13½ inches long, completely severing all the muscular and cartilaginous structures, including the cartilages of the ribs from the 4th to the 9th, and wounding the pleura and lung. In addition there was an abdominal wound 6½ inches long, extending from the navel to about two inches above Poupart's ligament, causing almost complete intestinal evisceration. The lung was partially collapsed. The cartilages were ligated with heavy silk, and the hemorrhage checked by ligature and by packing gauze in the interchondral spaces. The patient speedily recovered, and was discharged in a little over a month, the only disastrous result of his extraordinary injuries being a small ventral hernia.

[a] 435, 1873, 44. [b] 476, 1871, i., 78. [c] 656, 1842. [d] 702, Dec., 1890.

In **wounds of the diaphragm,** particularly those from stabs and gunshot injuries, death is generally due to accompanying lesions rather than to injury of the muscle itself. The older writers, particularly Glandorp,[880] Hollerius, and Alexander Benedictus, made a favorable diagnosis of wounds made in the fleshy portions of the diaphragm, but despaired of those in the tendinous portions. Bertrand, Fabricius Hildanus,[334] la Motte, Ravaton, Valentini,[794] and Glandorp, record instances of recovery from wounds of the diaphragm.

There are some peculiar causes of diaphragmatic injuries on record, laughter, prolonged vomiting, excessive eating, etc., being mentioned. On the other hand, in his "Essay on Laughter (du Ris)," Joubert quotes a case in which involuntary laughter was caused by a wound of the diaphragm; the laughter mentioned in this instance was probably caused by convulsive movements of the diaphragm, due to some unknown irritation of the phrenic nerve. Bremuse [a] gives an account of a man who literally split his diaphragm in two by the ingestion of four plates of potato soup, numerous cups of tea and milk, followed by a large dose of sodium bicarbonate to aid digestion. After this meal his stomach swelled to an enormous extent and tore the diaphragm on the right side, causing immediate death.

The diaphragm may be ruptured by external violence (a fall on the chest or abdomen), or by violent squeezing (railroad accidents, etc.), or according to Ashhurst, by spasmodic contraction of the part itself. If the injury is unaccompanied by lesion of the abdominal or thoracic viscera, the prognosis is not so unfavorable as might be supposed. Unless the laceration is extremely small, protrusion of the stomach or some other viscera into the thoracic cavity will almost invariably result, constituting the condition known as internal or **diaphragmatic hernia.** Paré [618] relates the case of a Captain who was shot through the fleshy portion of the diaphragm, and though the wound was apparently healed, the patient complained of a colicky pain. Eight months afterward the patient died in a violent paroxysm of this pain. At the postmortem by Guillemeau, a man of great eminence and a pupil of Paré, a part of the colon was found in the thorax, having passed through a wound in the diaphragm. Gooch [382] saw a similar case, but no history of the injury could be obtained. Bausch [b] mentions a case in which the omentum, stomach, and pancreas were found in the thoracic cavity, having protruded through an extensive opening in the diaphragm. Muys, Bonnet, Blancard, Schenck, Sennert, Fantoni, and Godefroy record instances in which, after rupture of the diaphragm, the viscera have been found in the thorax; there are many modern cases on record. Internal hernia through the diaphragm is mentioned by Cooper, Bowles, Fothergill, Monro, Ballonius, Derrecagiax, and Schmidt. Sir Astley Cooper [c] mentioned a case of hernia ventriculi from external violence, wherein the diaphragm was lacerated without any fracture

[a] 807, 1878. [b] Leipzig, 1665. [c] 550, vi., 374.

of the ribs. The man was aged twenty-seven, and being an outside passenger on a coach (and also intoxicated), when it broke down he was projected some distance, striking the ground with considerable force. He died on the next day, and the diagnosis was verified at the necropsy, the opening in the diaphragm causing stricture of the bowel.

Postempski[a] successfully treated a wound of the diaphragm complicated with a wound of the omentum, which protruded between the external opening between the 10th and 11th ribs; he enlarged the wound, forced the ribs apart, ligated and cut off part of the omentum, returned its stump to the abdomen, and finally closed both the wound in the diaphragm and the external wound with sutures. Quoted by Ashhurst, Hunter recorded a case of gunshot wound, in which, after penetrating the stomach, bowels, and diaphragm, the ball lodged in the thoracic cavity, causing no difficulty in breathing until shortly before death, and even then the dyspnea was mechanical—from gaseous distention of the intestines.

Peritonitis in the thoracic cavity is a curious condition which may be brought about by a penetrating wound of the diaphragm. In 1872 Sargent communicated to the Boston Society for Medical Improvement an account of a postmortem examination of a woman of thirty-seven, in whom he had observed major injuries twenty years before. At that time, while sliding down some hay from a loft, she was impaled on the handle of a pitchfork which entered the vagina, penetrated 22 inches, and was arrested by an upper left rib, which it fractured; further penetration was possibly prevented by the woman's feet striking the floor. Happily there was no injury to the bladder, uterus, or intestines. The principal symptoms were hemorrhage from the vagina and intense pain near the fractured rib, followed by emphysema. The pitchfork-handle was withdrawn, and was afterward placed in the museum of the Society, the abrupt bloody stain, 22 inches from the rounded end, being plainly shown. During twenty years the woman could never lie on her right side or on her back, and for half of this time she spent most of the night in the sitting position. Her last illness attracted little attention because her life had been one of suffering. After death it was found that the cavity in the left side of the chest was entirely filled with abdominal viscera. The opening in the diaphragm was four inches in diameter, and through it had passed the stomach, transverse colon, a few inches of the descending colon, and a considerable portion of the small intestines. The heart was crowded to the right of the sternum and was perfectly healthy, as was also the right lung. The left lung was compressed to the size of a hand. There were marked signs of peritonitis, and in the absence of sufficient other symptoms, it could be said that this woman had died of peritonitis in the left thoracic cavity.

Extended tolerance of foreign bodies loose in the thoracic cavity has been noticed. Tulpius[842] mentions a person who had a sponge shut up

[a] 174, 398.

in his thoracic cavity for six weeks; it was then voided by the mouth, and the man recovered. Fabricius Hildanus[334] relates a similar instance in which a sponge-tent was expelled by coughing. Arnot[a] reports a case in which a piece of iron was found in a cyst in the thorax, where it had remained for fourteen years. Leach[b] gives a case in which a bullet was impacted in the chest for forty-two years. Snyder[c] speaks of a fragment of knife-blade which was lodged in the chest twelve years and finally coughed up.

Foreign Bodies in the Bronchi.—Walnut kernels, coins, seeds, beans, corks, and even sponges have been removed from the bronchi. In the presence of Sir Morrell Mackenzie, Johnston of Baltimore removed a **toy locomotive** from the subglottic cavity by tracheotomy and thyreotomy. The child had gone to sleep with the toy in his mouth and had subsequently swallowed it.[d] Eldredge[e] presented a hopeless consumptive, who as a child of five had swallowed an **umbrella ferrule** while whistling through it, and who expelled it in a fit of coughing twenty-three years after. Eve of Nashville[f] mentions a boy who placed a fourpenny nail in a spool to make a whistle, and, by a violent inspiration, drew the nail deep into the left bronchus. It was removed by tracheotomy. Liston removed a large piece of bone from the right bronchus of a woman, and Houston tells of a case in which a molar tooth was lodged in a bronchus causing death on the eleventh day. Warren mentions spontaneous expulsion of a horse-shoe nail from the bronchus of a boy of two and one-half years. From Dublin, in 1844, Houston reports the case of a girl of sixteen who inhaled the wooden peg of a small fiddle and in a fit of coughing three months afterward expelled it from the lungs. In 1849 Solly communicated the case of a man who inhaled a pebble placed on his tongue to relieve thirst. On removal this pebble weighed 144 grains. Watson of Murfreesboro removed a portion of an umbrella rib from a trachea, but as he failed to locate or remove the ferrule, the case terminated fatally. Brigham[g] mentions a child of five who was seized with a fit of coughing while she had a small brass nail in her mouth; pulmonary phthisis ensued, and in one year she died. At the post-mortem examination the nail was found near the bifurcation of the right bronchus, and, although colored black, was not corroded.

Marcacci[h] reported an observation of the removal of a bean from the bronchus of a child of three and a half years. The child swallowed the bean while playing, immediately cried, and became hoarse. No one having noticed the accident, a diagnosis of croup was made and four leeches were applied to the neck. The dyspnea augmented during the night, and there

[a] 550, 1827, xiii., 281. [b] 175, 1857. [c] 267, 1870, xi., 401.
[d] Archives of Clinical Surgery, N. Y., 1876, i., 211, et seq.
[e] Rhode Island Med. Soc., Providence, 1860, i., 82. [f] 579, 1853, v., 129.
[g] 124, 1836, 46. [h] 790, 1876, clxx., p. 271.

was a whistling sound with each respiratory movement. On the next day the medical attendants suggested the possibility of a foreign body in the larynx. Tracheotomy was performed but the dyspnea continued, showing that the foreign body was lodged below the incision. The blood of one of the cut vessels entered the trachea and caused an extra paroxysm of dyspnea, but the clots of blood were removed by curved forceps. Marcacci fils practised suction, and placed the child on its head, but in vain. A feather was then introduced in the wound with the hope that it would clean the trachea and provoke respiration; when the feather was withdrawn the bean followed. The child was much asphyxiated, however, and five or six minutes elapsed before the first deep inspiration. The wound was closed, the child recovered its voice, and was well four days afterward. Annandale saw a little patient who had swallowed a bead of glass, which had lodged in the bronchus. He introduced the handle of a scalpel into the trachea, producing sufficient irritation to provoke a brusque expiration, and at the second attempt the foreign body was expelled. Hulke [a] records the case of a woman, the victim of a peculiar accident happening during the performance of tracheotomy, for an affection of the larynx. The internal canule of the tracheotomy-tube fell into the right bronchus, but was removed by an ingenious instrument extemporaneously devised from silver wire. A few years ago in this country there was much public excitement and newspaper discussion over the daily reports which came from the bedside of a gentleman who had swallowed a cork, and which had become lodged in a bronchus. Tracheotomy was performed and a special corkscrew devised to extract it, but unfortunately the patient died of slow asphyxiation and exhaustion. Herrick [b] mentions the case of a boy of fourteen months who swallowed a shawl-pin two inches long, which remained in the lungs four years, during which time there was a constant dry and spasmodic cough, and corresponding depression and emaciation. When it was ultimately coughed up it appeared in one large piece and several smaller ones, and was so corroded as to be very brittle. After dislodgment of the pin there was subsidence of the cough and rapid recovery.

Lapeyre [c] mentions an elderly gentleman who received a sudden slap on the back while smoking a cigarette, causing him to start and take a very deep inspiration. The cigarette was drawn into the right bronchus, where it remained for two months without causing symptoms or revealing its presence. It then set up a circumscribed pneumonia and cardiac dropsy which continued two months longer, at which time, during a violent fit of coughing, the cigarette was expelled enveloped in a waxy, mucus-like matter. Louis relates the case of a man who carried a louis-d'or in his lung for six and a half years.

There is a case on record [d] of a man who received a gunshot wound, the ball entering behind the left clavicle and passing downward and across to the right clavicle. Sometime afterward this patient expectorated two pieces of

[a] 476, 1876. [b] 218, 1871. [c] 476, 1890, 628. [d] 133, 1873, 146.

bone and a piece of gum blanket in which he was enveloped at the time of the injury. Carpenter[a] describes a case of fatal pleuritis, apparently due to the presence of four artificial teeth which had been swallowed thirteen years before.

Cardiac Injuries.—For ages it has been the common opinion relative to injuries of the heart that they are necessarily fatal and that, as a rule, death immediately follows their reception. Notwithstanding this current belief a careful examination of the literature of medicine presents an astounding number of cases in which the heart has been positively wounded, and the patients have lived days, months, and even recovered; postmortem examination, by revealing the presence of cicatrices in the heart, confirming the original diagnosis. This question is one of great interest as, in recent years, there has been constant agitation of the possibility of surgical procedures in cardiac as well as cerebral injuries. Del Vecchio[b] has reported a series of experiments on dogs with the conclusion that in case of wounds in human beings **suture of the heart** is a possible operation. In this connection he proposes the following operative procedure: Two longitudinal incisions to be made from the lower border of the 3d rib to the upper border of the 7th rib, one running along the inner margin of the sternum, the other about ten mm. inside the nipple-line. These incisions are joined by a horizontal cut made in the fourth intercostal space. The 4th, 5th, and 6th ribs and cartilages are divided and the outer cutaneous flaps turned up; pushing aside the pleura with the finger, expose the pericardium and incise it longitudinally; suture the heart-wound by interrupted sutures. Del Vecchio adds that Fischer has collected records of 376 cases of wounds of the heart with a mortality two to three minutes after the injury of 20 per cent. Death may occur from a few seconds to nine months after the accident. Keen and Da Costa[c] quote Del Vecchio, and, in comment on his observations, remark that death in cases of wound of the heart is due to pressure of effused blood in the pericardial sac, and, because this pressure is itself a check to further hemorrhage, there seems, as far as hemorrhage is concerned, to be rather a question whether operative interference may not be itself more harmful than beneficial. It might be added that the shock to the cardiac action might be sufficient to check it, and at present we would have no sure means of starting pulsation if once stopped. In heart-injuries, paracentesis, followed, if necessary, by incision of the pericardium, is advised by some surgeons.

Realizing the fatality of injuries of the heart, in consequence of which almost any chance by operation should be quickly seized by surgeons rather than trust the lives of patients to the infinitesimal chance of recovery, it would seem that the profession should carefully consider and discuss the feasibility of any procedure in this direction, no matter how hypothetic.

Hall[d] states that his experience in the study of cardiac wounds, chiefly

[a] 392, 1842. [b] 684, April 4, 1895. [c] 843, 337. [d] 533, Nov. 2, 1895.

on game-animals, would lead him to the conclusion that transverse wounds of the lower portions of the heart, giving rise to punctures rather than extensive lacerations, do not commonly cause cessation of life for a time varying from some considerable fraction of a minute to many minutes or even hours, and especially if the puncture be valvular in character, so as to prevent the loss of much blood. However, if the wound involve the base of the organ, with extensive laceration of the surrounding parts, death is practically instantaneous. It would seem that injury to the muscular walls of the heart is much less efficient in the production of immediate death than destruction of the cardiac nervous mechanism, serious irritation of the latter producing almost instantaneous death from shock. In addition, Hall cites several of the instances on which he based his conclusions. He mentions two wild geese which flew respectively $\frac{1}{4}$ and $\frac{3}{4}$ of a mile after having been shot through the heart, each with a pellet of BB shot, the base in each instance being uninjured; in several instances antelope and deer ran several rods after being shot with a rifle ball in a similar manner; on the other hand, death was practically instantaneous in several of these animals in which the base of the heart was extensively lacerated. Again, death may result instantaneously from wounds of the precordial region, or according to Erichsen, if held directly over the heart, from the discharge of a pistol containing powder alone, a result occasionally seen after a blow on the precordial region. It is well, however, to state that in times of excitement, one may receive an injury which will shortly prove fatal, and yet not be aware of the fact for some time, perhaps even for several minutes. It would appear that the nervous system is so highly tuned at such times, that it does not respond to reflex irritations as readily as in the absence of excitement.

Instances of Survival after Cardiac Injuries.—We briefly cite the principal interesting instances of cardiac injuries in which death has been delayed for some time, or from which the patient ultimately recovered.

Paré[618] relates the case of a soldier who received a blow from a halberd, penetrating the left ventricle, and who walked to the surgeon's tent to have his wound dressed and then to his own tent 250 yards away. Diemerbroeck[a] mentions two instances of long survival after cardiac injuries, in one of which the patient ran 60 paces after receiving the wound, had complete composure of mind, and survived nine days. There is an instance[b] in which a man ran 400 paces after penetration of the left ventricle, and lived for five hours. Morand[575] gives an instance of survival for five days after wound of the right ventricle. Saucerotte[c] speaks of survival for three days after injury to the heart.

Babington[d] speaks of a case of heart-injury, caused by transfixion by a bayonet, in which the patient survived nine hours. Other older cases are as

[a] 303, L. ii., cap. vi., 266 and 381.
[b] 470, T. xxxv.
[c] Mélanges de Chirurgie, etc.
[d] Medical Records, etc., 1798, No. 4.

follows: l'Ecluse,[a] seven days; the Ephemerides, four and six days; Col de Vilars, twelve days; Marcucci,[b] eighteen days; Bartholinus,[c] five days; Durande,[d] five days; Boyer, five days; Capelle,[e] twenty-six hours; Fahner, eleven days; Marigues,[f] thirteen days; Morgagni, eight days; la Motte,[g] twelve hours; Rhodius,[h] Riedlin,[i] two days; Saviard,[718] eleven days; Sennert,[j] three days; Triller,[k] fourteen days; and Tulpius,[l] two and fifteen days; and Zittman,[m] eight days.

The Duc de Berri, heir to the French throne, who was assassinated in 1826, lived several hours with one of his ventricles opened. His surgeon, Dupuytren, was reprimanded for keeping the wound open with a probe introduced every two hours, but this procedure has its advocates at the present day. Randall[n] mentions a gunshot wound of the right ventricle which did not cause death until the sixty-seventh day. Grant[o] describes a wound in which a ball from a revolver entered a little to the right of the sternum, between the cartilages of the 5th and 6th ribs, and then entered the right ventricle about an inch from the apex. It emerged from the lower part, passed through the diaphragm, the cardiac end of the stomach, and lodged in the left kidney. The patient remained in a state of collapse fifteen hours after being shot, and with little or no nourishment lived twenty-six days. At the postmortem examination the wounds in the organs were found to be healed, but the cicatrices were quite evident. Bowling[p] gives a case of gunshot wound of the shoulder in which death resulted eleven weeks after, the bullet being found in the left ventricle of the heart. Thompson[q] has reported a bayonet wound of the heart, after the reception of which the patient lived four days. The bayonet entered the ventricle about 1½ inches from the left apex, traversing the left wall obliquely, and making exit close to the septum ventriculorum. Roberts[r] mentions a man who ran 60 yards and lived one hour after being shot through both lungs and the right auricle. Curran[s] mentions the case of a soldier who, in 1809, was wounded by a bullet which entered his body to the left of the sternum, between the 2d and 3d ribs. He was insensible a half hour, and was carried aboard a fighting ship crowded with sailors. There was little hemorrhage from his wound, and he survived fourteen days. At the postmortem examination some interesting facts were revealed. It was found that the right ventricle was transversely opened for about an inch, the ball having penetrated its anterior surface, near the origin of the pulmonary artery (Fig. 220). The ball was found loose in the pericardium, where it had fallen during the necropsy. There was a circular lacerated opening in the tricuspid valve, and the ball must have been in the right auricle during the

[a] 418, 1744. [b] Orteschi Giornale di Medicina, Venet, 1763. [c] 190, cent. i., hist. 77.
[d] Hufeland, N. Annalen. i., p. 301. [e] Journal de Santé, T. i. [f] 462, T. xlviii, 243.
[g] Chirurgie, obs. 228. [h] 680, cent. ii., obs. 39. [i] 683, 1700, 985.
[j] Opera chirurg., L. v., P. iv., c. 3. [k] Diss. Viteb., 1775. [l] 842, L. ii., c. 18.
[m] 835, cent. iii., cas. 50. [n] 124, 1829. [o] 124, July, 1857. [p] 476, 1852, ii., 491.
[q] 548, 1863, ii., 487. [r] 681, 1871, xii., 607. [s] 476, 1887, i., 673.

fourteen days in which the man lived. Vite [a] mentions an example of remarkable tenacity of life after reception of a cardiac wound, the subject living four days after a knife-wound penetrating the chest into the pericardial sac and passing through the left ventricle of the heart into the opposite wall. Boone [b] speaks of a gunshot wound in which death was postponed until the thirteenth day. Bullock [c] mentions a case of gunshot wound in which the ball was found lodged in the cavity of the ventricle four days and eighteen hours after infliction of the wound. Carnochan [d] describes a penetrating wound of the heart in a subject in whom life had been protracted eleven days. After death the bullet was found buried and encysted in the heart. Holly [e] reports a case of pistol-shot wound through the right ventricle, septum, and aorta, with the ball in the left ventricle. There was apparent recovery in fourteen days and sudden death on the fifty-fifth day.

Hamilton [f] gives an instance of a shoemaker sixty-three years old who, while carrying a bundle, fell with rupture of the heart and lived several minutes. On postmortem examination an opening in the heart was found large enough to admit a blowpipe. Noble [g] speaks of duration of life for five and a half days after rupture of the heart; and there are instances on record in which life has been prolonged for thirteen hours [h] and for fifty-three hours [i] after a similar injury. Glazebrook [j] reports the case of a colored man of thirty, of powerful physique, who was admitted to the Freedmen's Hospital, Washington, D. C., at 12.30 A. M., on February 5, 1895. Upon examination by the surgeons, an incised wound was discovered one inch above the left nipple, 3¼ inches to the left of the median line, the incision being 2¼ inches in length and its direction parallel with the 3d rib. The man's general condition was fairly good, and the wound was examined. It was impossible to trace its depth further than the 3d rib, although probing was resorted to; it was therefore considered a simple wound, and dressed accordingly. Twelve hours later symptoms of internal hemorrhage were noticed, and at 8 A. M., February 6th, the man died after surviving his injury thirty-two hours. A necropsy was held three hours after death, and an oblique incision ¾ inch in

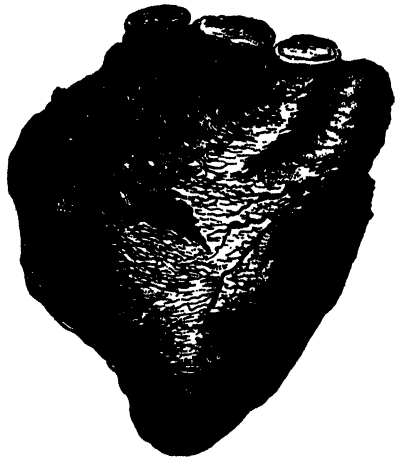


Fig. 220.—Wound of the heart; survival, fourteen days (Curran).

[a] 681, 1876. [b] 124, 1879, 589. [c] 712, 1858, i., 295. [d] 128, 1855.
[e] 538, 1878. [f] 476, 1860. [g] 476, 1889, i., 774.
[h] 224, 1881, ii., 1051. [i] 224, 1889, ii., 204. [j] 533, lxvi., 508.

length was found through the cartilage-end of the 3d rib. A similar wound was next found in the pericardium, and upon examining the heart there was seen a clean, incised wound ½ inch in length, directly into the right ventricle, the endocardial wound being ⅜ inch long. Both the pericardium and left pleura were distended with fresh blood and large clots. Church[a] reports a case of gunshot wound of the heart in a man of sixty-seven who survived three hours. The wound had been made by a pistol bullet (32 caliber), was situated 1½ inches below the mammary line, and slightly to the left of the center of the sternum; through it considerable blood had escaped. The postmortem examination showed that the ball had pierced the sternum just above the xiphoid cartilage, and had entered the pericardium to the right and at the lower part. The sac was filled with blood, both fresh and clotted. There was a ragged wound in the anterior wall ½ inch in diameter. The wound of exit was ⅜ inch in diameter. After traversing the heart the ball had penetrated the diaphragm, wounded the omentum in several places, and become lodged under the skin posteriorly between the 9th and 10th ribs. Church adds that the "Index Catalogue of the Surgeon-General's Library" at Washington contains 22 cases of direct injury to the heart, all of which lived longer than his case: 17 lived over three days; eight lived over ten days; two lived over twenty-five days; one died on the fifty-fifth day, and there were three well-authenticated recoveries. Purple[b] tabulates a list of 42 cases of heart-injury which survived from thirty minutes to seventy days.

Fourteen instances of gunshot wounds of the heart have been collected from U. S. Army reports,[c] in all of which death followed very promptly, except in one instance in which the patient survived fifty hours. In another case the patient lived twenty-six hours after reception of the injury, the conical pistol-ball passing through the anterior margin of the right lobe of the lung into the pericardium, through the right auricle, and again entered the right pleural cavity, passing through the posterior margin of the lower lobe of the right lung; at the autopsy it was found in the right pleural cavity. The left lung and cavity were perfectly normal. The right lung was engorged and somewhat compressed by the blood in the pleural cavity. The pericardium was much distended and contained from six to eight ounces of partially coagulated blood. There was a fibrinous clot in the left ventricle.

Nonfatal Cardiac Injuries.—Wounds of the heart are not necessarily fatal. Of 401 cases of cardiac injury collected by Fischer[d] there were as many as 50 recoveries, the diagnosis being confirmed in 33 instances by an autopsy in which there were found distinct signs of the cardiac injury. By a peculiar arrangement of the fibers of the heart, a wound transverse to one layer of fibers is in the direction of another layer, and to a certain extent, therefore, valvular in function; it is probably from this fact that punctured wounds of the heart are often attended with little or no bleeding.

[a] 533, Oct. 27, 1894. [b] 597, xiv., 411–434. [c] 847, 33. [d] 174, 396.

Among the older writers, several instances of nonfatal injuries to the heart are recorded. Before the present century scientists had observed game-animals that had been wounded in the heart in the course of their lives, and after their ultimate death such direct evidence as the presence of a bullet or an arrow in their hearts was found. Rodericus a Veiga tells the story of a deer that was killed in hunting, and in whose heart was fixed a piece of arrow that appeared to have been there some time. Glandorp[a] experimentally produced a nonfatal wound in the heart of a rabbit. Wounds of the heart, not lethal, have been reported by Benivenius,[198] Marcellus Donatus,[b] Schott,[c] Stalpart van der Wiel,[d] and Wolff. Ollenrot reports an additional instance of recovery from heart-injury, but in his case the wound was only superficial.

There is a recent case[e] of a boy of fourteen, who was wounded in the heart by a pen-knife stab. The boy was discharged cured from the Middlesex Hospital, but three months after the reception of the injury he was taken ill and died. A postmortem examination showed that the right ventricle had been penetrated in a slanting direction; the cause of death was apoplexy, produced by the weakening and thinning of the heart's walls, the effect of the wound. Tillaux[f] reports the case of a man of sixty-five, the victim of general paralysis, who passed into his chest a blade 16 cm. long and 2 mm. broad. The wound of puncture was 5 cm. below the nipple and 2 cm. to the outside. The left side of the chest was emphysematous and ecchymosed. The heart-sounds were regular, and the elevation of the skin by the blade coincided with the ventricular systole. The blade was removed on the following day, and the patient gradually improved. Some thirteen months after he had expectoration of blood and pus and soon died. At the necropsy it was seen that the wound had involved both lungs; the posterior wall of the ventricle and the inferior lobe of the right lung were traversed from before backward, and from left to right, but the ventricular cavity was not penetrated. Strange to say, the blade had passed between the vertebral column and the esophagus, and to the right of the aorta, but had wounded neither of these organs.

O'Connor[490] mentions a graduate of a British University who, with suicidal intent, transfixed his heart with a darning-needle. It was extracted by a pair of watchmaker's pliers. In five days the symptoms had all abated, and the would-be suicide was well enough to start for the Continent. Mühlig[g] was consulted by a mason who, ten years before, had received a blow from a stiletto near the left side of the sternum. The cicatrix was plainly visible, but the man said he had been able to perform his daily labors, although at the present time suffering from intense dyspnea and anasarca. A loud bel-

[a] 380, Obs., 83. [b] 306, L. v., c. iv., 569. [c] "Physic. Curios." L., iii., 576.
[d] 750, cent. ii., Obs., 23.
[f] 362, No. 20, 1868.
[e] 548, 1863, ii., 499.
[g] 645, 1860, No. 43.

lows-sound could be heard, which the man said had been audible since the time of reception of the injury. This was a double bruit accompanying systole, and entirely obscuring the physical signs. From this time the man speedily failed, and after his death there were cicatricial signs found, particularly on the wall of the left ventricle, together with patency of the interventricular septum, with signs of cicatrization about this rent. At the side of the left ventricle the rent was twice as large and lined with cicatricial tissue.

Stelzner[a] mentions a young student who attempted suicide by thrusting a darning-needle into his heart. He complained of pain and dyspnea; in twenty-four hours his symptoms increased to such an extent that operation was deemed advisable on account of collapse. The 5th rib was resected and the pleural cavity opened. When the pericardial sac was incised, a teaspoonful of turbid fluid oozed out, and the needle was felt in an oblique position in the right ventricle. By pressure of a finger passed under the heart, the eye of the needle was pressed through the anterior wall and fixed on the operator's finger-nail. An attempt to remove by the forceps failed, as the violent movements of the heart drew the needle back into the cavity. About this stage of the operation an unfortunate accident happened—the iodoform tampon, which protected the exposed pleural cavity, was drawn into this cavity during a deep inspiration, and could not be found. Notwithstanding subsequent pneumothorax and extensive pleuritic effusion, the patient made a good recovery at the end of the fourth week and at the time of report it was still uncertain whether the needle remained in the heart or had wandered into the mediastinum. During the discussion which followed the report of this case, Hahn showed a portion of a knitting-needle which had been removed from the heart of a girl during life. The extraction was very slow in order to allow of coagulation along the course of the wound in the heart, and to guard against hemorrhage into the pericardial sac, which is so often the cause of death in punctured wounds of this organ. Hahn remarked that the pulse, which before the removal had been very rapid, sank to 90.

Marks[b] reports the case of a stab-wound penetrating the left 9th intercostal space, the diaphragm, pleura, pericardium, and apex of the heart. It was necessary to enlarge the wound, and, under an anesthetic, after removing one and one-half inches of the 9th and 10th ribs, the wound was thoroughly packed with iodoform gauze and in twenty-one days the patient recovered. Lavender[c] mentions an incised wound of the heart penetrating the right ventricle, from which the patient recovered. Purple[d] gives an account of a recovery from a wound penetrating both ventricles. The diagnosis was confirmed by a necropsy nine years thereafter. Stoll[e] records a nonfatal injury to the heart.

Mastin[f] reports the case of a man of thirty-two who was shot by a 38-cali-

[a] 260, 1883, No. 25. [b] 529, 1893. [c] 770, 1851, 104, et seq.
[d] 597, xiv., 411 to 434 [e] 398, i., 354. [f] 533, 1895, i., 728.

ber Winchester, from an ambush, at a distance of 110 yards. The ball entered near the chest posteriorly on the left side just below and to the outer angle of the scapula, passed between the 7th and 8th ribs, and made its exit from the intercostal space of the 4th and 5th ribs, 2¼ inches from the nipple. A line drawn from the wound of entrance to that of exit would pass exactly through the right ventricle. After receiving the wound the man walked about twenty steps, and then, feeling very weak from profuse hemorrhage from the front of the wound, he sat down. With little or no treatment the wound closed and steady improvement set in; the patient was discharged in three weeks. As the man was still living at last reports, the exact amount of damage done in the track of the bullet is not known, although Mastin's supposition is that the heart was penetrated.

Mellichamp[a] speaks of a gunshot wound of the heart with recovery, and Ford[b] records an instance in which a wound of the heart by a buckshot was followed by recovery. O'Connor reports a case under his observation in which a pistol-ball passed through three of the four cavities of the heart and lodged in the root of the right lung. The patient, a boy of fifteen, died of the effects of cardiac disease three years and two months later. Bell mentions a case in which, six years after the receipt of a gunshot wound of the chest, a ball was found in the right ventricle. Christison[c] speaks of an instance in which a bullet was found in the heart of a soldier in Bermuda, with no apparent signs of an opening to account for its entrance. There is a case on record[d] of a boy of fourteen who was shot in the right shoulder, the bullet entering through the right upper border of the trapezius, two inches from the acromion process. Those who examined him supposed the ball was lodged near the sternal end of the clavicle, four or five inches from where it entered. In about six weeks the boy was at his labors. Five years later he was attacked with severe pneumonia and then first noticed tumultuous action of the heart which continued to increase after his recovery. Afterward the pulsation could be heard ten or 12 feet away. He died of another attack of pneumonia fifteen years later and the heart was found to be two or three times its natural size, soft and flabby, and, on opening the right ventricle, a bullet was discovered embedded in its walls. There was no scar of entrance discernible, though the pericardium was adherent. Biffi of Milan[e] describes the case of a lunatic who died in consequence of gangrene of the tongue from a bite in a paroxysm of mania. At the necropsy a needle, six cm. in length, was found transfixing the heart, with which the relatives of the deceased said he had stabbed himself twenty-two months prior to his death. There is a collection of cases[f] in which bullets have been lodged in the heart from twenty to thirty years.

Balch[g] reports a case in which a leaden bullet remained twenty years in the walls of the heart. Hamilton[h] mentions an instance of gunshot wound

[a] 264, 1876, iv., 17. [b] 538, 1875. [c] 319, 1853. [d] 548, 1861, ii., 229.
[e] 360, Oct. 16, 1869. [f] 548, 1861, ii., 229. [g] 124, xlii., 293. [h] 597, 1867, iv., 379.

of the heart, in which for twenty years a ball was embedded in the wall of the right ventricle, death ultimately being caused by pneumonia. Needles have quite frequently been found in the heart after death; Graves, Leaming, Martin, Neill, Piorry, Ryerson, and others record such cases. Callender[a] mentions recovery of the patient after removal of a needle from the heart.

Garangeot mentions an aged Jesuit of seventy-two, who had in the substance of his heart a bone 4½ inches long and possibly an inch thick. This case is probably one of ossification of the cardiac muscle; in the same connection Battolini says that the heart of Pope Urban VII. contained a bone shaped like the Arab *T*.

Among the older writers we frequently read of hairs, worms, and snakes being found in the cavities of the heart. The Ephemerides, Zacutus Lusitanus, Paré, Swinger, Riverius, and Senac are among the authorities who mention this circumstance. The deception was possibly due to the presence of loose and shaggy membrane attached to the endocardial lining of the heart, or in some cases to echinococci or trichinæ. A strange case of **foreign body in the heart** was reported[b] some time since in England. The patient had swallowed a thorn of the Prunus spinosa (Linn.), which had penetrated the esophagus and the pericardium and entered the heart. A postmortem examination one year afterward confirmed this, as a contracted cicatrix was plainly visible on the posterior surface of the heart about an inch above the apex, through which the thorn had penetrated the right ventricle and lodged in the tricuspid valve. The supposition was that the thorn had been swallowed while eating radishes. Buck[c] mentions a case of hydatid cysts in the wall of the left ventricle, with rupture of the cysts and sudden death.

It is surprising the extent of **injury to the pericardium** Nature will tolerate. In his "Comment on the Aphorisms of Hippocrates," Cardanus says that he witnessed the excision of a portion of the pericardium with the subsequent cure of the patient. According to Galen, Marulus, the son of Mimographus, recovered after a similar operation. Galen also adds, that upon one occasion he removed a portion of carious sternum and found the pericardium in a putrid state, leaving a portion of the heart naked. It is said that in the presence of Leucatel and several theologians, François Botta opened the body of a man who died after an extended illness and found the pericardium putrefied and a great portion of the heart destroyed, but the remaining portion still slightly palpitating. In this connection Young[d] mentions a patient of sixty-five who in January, 1860, injured his right thumb and lost the last joint by swelling and necrosis. Chloroform was administered to excise a portion of the necrosed bone and death ensued. Postmortem examination revealed gangrene of the heart and a remarkable tendency to gangrene elsewhere (omentum, small intestines, skin, etc.). Recently, Dalton[e] records a remarkable case of stab-wound of the pericardium with division of the inter-

[a] 550, lvi., 203. [b] 548, 1861, ii., 119. [c] 476, 1879. [d] 273, 1868. [e] 150, Feb., 1895.

costal artery, upon which he operated. An incision eight inches long was made over the 4th rib, six inches of the rib were resected, the bleeding intercostal artery was ligated, the blood was turned out of the pericardial cavity, this cavity being irrigated with hot water. The wound in the pericardium, which was two inches long, was sutured and the external wound was closed. Recovery followed. Harris [a] gives an instance of a man who was injured by a bar of iron falling on his shoulder, producing a compound fracture of the ribs as low as the 7th, and laying the heart and lungs bare without seriously injuring the pericardium.

Rupture of the heart from contusion of the chest is not always instantly fatal. According to Ashhurst, Gamgee has collected 28 cases of rupture of this viscus, including one observed by himself. In nine of these cases there was no fracture, and either no bruise of the parietes or a very slight one. The pericardium was intact in at least half of the cases, and in 22 in which the precise seat of lesion was noticed the right ventricle was ruptured in eight, the left in three, the left auricle in seven, the right in four. The longest period during which any patient survived the injury was fourteen hours.

Among the older writers who note this traumatic injury are Fine, who mentions concussion rupturing the right ventricle, and Ludwig, who reports a similar accident. Johnson [b] mentions rupture of the left ventricle in a paroxysm of epilepsy. There is another species of rupture of the heart which is not traumatic, in which the rupture occurs spontaneously, the predisposing cause being fatty degeneration, dilatation, or some other pathologic process in the cardiac substance. It is quite possible that the older instances of what was known as "broken-heart," which is still a by-word, were really cases in which violent emotion had produced rupture of a degenerated cardiac wall. Wright [c] gives a case of spontaneous rupture of the heart in which death did not occur for forty-eight hours. Barth has collected 24 cases of spontaneous rupture of the heart, and in every instance the seat of lesion was in the left ventricle. It was noticed that in some of these cases the rupture did not take place all at once, but by repeated minor lacerations, death not ensuing in some instances for from two to eleven days after the first manifestation of serious symptoms. A more recent analysis is given by Meyer of cases reported since 1870: [d] Meyer collects 25 cases of rupture of the left ventricle, seven of the right ventricle, and four of the right auricle. Within the last year Collings [e] has reported a case of idiopathic rupture of the heart in a man of fifty-three, who had always lived a temperate life, and whose only trouble had been dyspepsia and a weak heart. There was no history of rheumatism or rheumatic fever. The man's father had died suddenly of heart disease. After feeling out of sorts for a time, the man experienced severe pain in the precordium and felt too ill to leave his bed. He gradually became worse and

[a] 218, 1871, 241. [b] Medic. Bemerk. und Untersuchungen, L. ii., 103, et seq.
[c] "Med. Observ. and Queries," vol. vi. [d] Quoted 174, 388. [e] 476, 1895, No. 3738, 987.

sick after taking food. Speech became thick, the mouth was drawn to the right, and the right eye was partially closed. The left arm became paralyzed, then the right leg. The tongue deviated to the right on protrusion. The sphincters were unaffected. The heart sounds were faint and without added sounds. The man was moved to a water-bed, his body and head being kept horizontal, and great care being taken to avoid sudden movement. Later, when his pelvis was raised to allow the introduction of a bed-pan, almost instantaneous death ensued. Upon postmortem examination prolonged and careful search failed to reveal any microscopic change in the brain, its vessels, or the meninges. On opening the pericardium it was found to be filled with blood-clot, and on washing this away a laceration about 1½ inches in length was found in the left ventricle; the aperture was closed by a recent clot. The cavities of the heart were dilated, the walls thin and in advanced stage of fatty degeneration. There was no valvular disease. The aorta and its main branches were atheromatous. Both lungs contained calcifying tubercle; the abdomen was loaded with fat; the spleen was soft; the kidneys were engorged, but otherwise healthy.

Stokes[a] gives the case of a man who was severely crushed between the arms of a water-wheel of great size and the embankment on which the axle of the wheel was supported; a peculiar factor of the injury being that his **heart** was **displaced from left to right.** At the time of report, after recovery from the injury, the patient exhibited remarkable tolerance of great doses of digitalis. When not taking digitalis, his pulse was 100 to 120, regular, and never intermittent.

Hypertrophy of the Heart.—The heart of a man of ordinary size weighs nine ounces, and that of a woman eight; in cases of hypertrophy, these weights may be doubled, although weights above 25 ounces are rare. According to Osler, Beverly Robinson describes a heart weighing 53 ounces, and Dulles has reported one weighing 48 ounces. Among other modern records are the following: Fifty and one-half ounces,[b] 57 ounces,[c] and one weighing four pounds and six ounces.[d] The Ephemerides[e] contains an incredible account of a heart that weighed 14 pounds. Favell[f] describes a heart that only weighed 3½ ounces.

Wounds of the aorta are almost invariably fatal, although cases are recorded by Pelletan, Heil, Legouest, and others, in which patients survived such wounds for from two months to several years. Green[g] mentions a case of stab-wound in the suprasternal fossa. The patient died one month after of another cause, and at the postmortem examination the aorta was shown to have been opened; the wound in its walls was covered with a spheric, indurated coagulum. No attempt at union had been made.

Zillner[h] observed a penetrating wound of the aorta after which the patient

[a] 490, 1831. [b] 476, 1854, ii., 332 [c] 548, 1884, i., 150.
[d] 548, 1860, ii., 644. [e] 104, Dec. 3, Ann., iii., Obs., 166.
[f] 656, 1843, v., 358. [g] 741, 1855. [h] Wien. Med. Zeitung, Nov. 29, 1881.

lived sixteen days, finally dying of pericarditis. Zillner attributed this circumstance to the small size of the wound, atheroma and degeneration of the aorta and slight retraction of the inner coat, together with a possible plugging of the pericardial opening. In 1880 Chiari said that while dissecting the body of a man who died of phthisis, he found a false aneurysm of the ascending aorta with a transverse rupture of the vessel by the side of it, which had completely cicatrized. Hill [a] reports the case of a soldier who was stabbed with a bowie-knife nine inches long and three inches wide. The blade passed through the diaphragm, cut off a portion of the liver, and severed the descending aorta at a point about the 7th dorsal vertebra; the soldier lived over three hours after complete division of this important vessel. Heil [b] reports the case of a man of thirty-two, a soldier in the Bavarian army, who, in a quarrel in 1812, received a stab in the right side. The instrument used was a common table-knife, which was passed between the 5th and 6th ribs, entering the left lung, and causing copious hemorrhage. The patient recovered in four months, but suffered from amaurosis which had commenced at the time of the stab. Some months afterward he contracted pneumonia and was readmitted to the hospital, dying in 1813. At the postmortem the cicatrix in the chest was plainly visible, and in the ascending aorta there was seen a wound, directly in the track of the knife, which was of irregular border and was occupied by a firm coagulum of blood. The vessel had been completely penetrated, as, by laying it open, an internal cicatrix was found corresponding to the other. Fatal hemorrhage had been avoided in this case by the formation of coagulum in the wound during the syncope immediately following the stab, possibly aided by extended exposure to cold.

Sundry Cases.—Sandifort [709] mentions a curious case of coalescence of the esophagus and aorta, with ulceration and consequent rupture of the aorta, the hemorrhage proceeding from the stomach at the moment of rupture.

Heath [c] had a case of injury to the external iliac artery from external violence, with subsequent obliteration of the vessel. When the patient was discharged no pulse could be found in the leg.

Dismukes [d] reports a case in which the patient had received 13 wounds, completely severing the subclavian artery, and, without any medical or surgical aid, survived the injury two hours.

Illustrative of the degree of hemorrhage which may follow an injury so slight as that of falling on a needle we cite an instance, reported by a French authority,[e] of a child who picked up a needle, and, while running with it to its mother, stumbled and fell, the needle penetrating the 4th intercostal space, the broadened end of it remaining outside of the wound. The mother seized the needle between her teeth and withdrew it, but the child died, before

[a] 131, 1875, ii., 389. [b] 834, 1837–8. [c] 548, 1874, ii., 363.
[d] 579, 1856, xi., 59. [e] 646, 1883.

medical aid could be summoned, from internal hemorrhage, causing pulmonary pressure and dyspnea.

Rupture of the esophagus is attributable to many causes. Dryden[a] mentions vomiting as a cause, and Guersant[b] reports the case of a little girl of seven, who, during an attack of fever, ruptured her esophagus by vomiting. In 1837 Heyfelder reported the case of a drunkard, who, in a convulsion, ruptured his esophagus and died. Williams[c] mentions a case in which not only the gullet, but also the diaphragm, was ruptured in vomiting. In this country, Bailey[d] and Fitz[e] have recorded cases of rupture of the esophagus. Brewer[587] relates a parallel instance of rupture from vomiting. All the foregoing cases were linear ruptures, but there is a unique case given by Boerhaave in 1724, in which the rent was transverse. Ziemssen and Mackenzie[499] have both translated from the Latin the report of this case which is briefly as follows: The patient, Baron de Wassenaer, was fifty years of age, and, with the exception that he had a sense of fulness after taking moderate meals, he was in perfect health. To relieve this disagreeable feeling he was in the habit of taking a copious draught of an infusion of "blessed thistle" and ipecacuanha. One day, about 10.30 in the evening, when he had taken no supper, but had eaten a rather hearty dinner, he was bothered by a peculiar sensation in his stomach, and to relieve this he swallowed about three tumblerfuls of his usual infusion, but to no avail. He then tried to excite vomiting by tickling the fauces, when, in retching, he suddenly felt a violent pain; he diagnosed his own case by saying that it was "the bursting of something near the pit of the stomach." He became prostrated and died in eighteen and one-half hours; at the necropsy it was seen that without any previously existing signs of disease the esophagus had been completely rent across in a transverse direction.

Schmidtmuller[f] mentions separation of the esophagus from the stomach; and Flint[g] reports the history of a boy of seven who died after being treated for worms and cerebral symptoms. After death the contents of the stomach were found in the abdominal cavity, and the esophagus was completely separated from the stomach. Flint believed the separation was postmortem, and was possibly due to the softening of the stomach by the action of the gastric acids. In this connection may be mentioned the case reported by Hanford[h] of a man of twenty-three who had an attack of hematemesis and melanema two years before death. A postmortem was made five hours after death, and there was so much destruction of the stomach by a process resembling digestion that only the pyloric and cardiac orifices were visible. Hanford suggests that this was an instance of antemortem digestion of the stomach which physiologists claim is impossible.

[a] 524, 1788, iii., 308.
[b] Bull. de la Fac. de Méd. de Paris, 1812, 73.
[c] 779, 1848, i., 151.
[d] 597, May, 1873.
[e] 124, Jan., 1877.
[f] 101, L. i., No. 6.
[g] 526, 1848, 715.
[h] 476, 1886, i., 546.

Nearly all cases of **rupture of the stomach** are due to carcinoma, ulcer, or some similar condition, although there have been instances of rupture from pressure and distention. Wunschheim[a] reports the case of a man of fifty-two who for six months presented symptoms of gastric derangement, and who finally sustained spontaneous rupture of the posterior border of the stomach due to overdistention. There was a tear two inches long, beginning near the cardiac end and running parallel to the lesser curvature. The margin of the tear showed no evidence of digestion. There were obstructing esophageal neoplasms about 10½ inches from the teeth, which prevented vomiting. In reviewing the literature Wunschheim found only six cases of spontaneous rupture of the stomach. Arton[b] reports the case of a negro of fifty who suffered from tympanites. He was a hard drinker and had been aspirated several times, gas heavily laden with odors of the milk of asafetida being discharged with a violent rush. The man finally died of his malady, and at postmortem it was found that his stomach had burst, showing a slit four inches long. The gall bladder contained two quarts of inspissated bile.

Fulton[c] mentions a case of rupture of the esophageal end of a stomach in a child. The colon was enormously distended and the walls thickened. When three months old it was necessary to puncture the bowel for distention. Collins[d] describes spontaneous rupture of the stomach in a woman of seventy-four, the subject of lateral curvature of the spine, who had frequent attacks of indigestion and tympanites. On the day of death there was considerable distention, and a gentle purgative and antispasmodic were given. Just before death a sudden explosive sound was heard, followed by collapse. A necropsy showed a rupture two inches long and two inches from the pyloric end. Lallemand[e] mentions an instance of the rupture of the coats of the stomach by the act of vomiting. The patient was a woman who had suffered with indigestion five or six months, but had been relieved by strict regimen. After indulging her appetite to a greater extent than usual, she experienced nausea, and made violent and ineffectual efforts to discharge the contents of the stomach. While suffering great agony she experienced a sensation as if something was tearing in the lower part of her belly. The woman uttered several screams, fell unconscious, and died that night. Postmortem examination showed that the anterior and middle part of the stomach were torn obliquely to the extent of five inches. The tear extended from the smaller toward the greater curvature. The edges were thin and irregular and presented no marks of disease. The cavity of the peritoneum was full of half-digested food. The records of St. Bartholomew's Hospital, London, contain the account of a man of thirty-four who for two years had been the subject of paroxysmal pain in the stomach. The pains usually continued for several hours and subsided with vomiting. At St. Bartholomew's he had an attack of vomiting after a debauch. On the following day he was seized

[a] 644, xviii., No. 3, 21. [b] 538, 1878, 208. [c] 606, 1893. [d] 134, 1894. [e] 302, xlix.

with vomiting accompanied by nausea and flatus, and after a sudden attack of pain at the pit of the stomach which continued for two hours, he died. A ragged opening at the esophageal orifice, on the anterior surface of the stomach was found. This tear extended from below the lesser curvature to its extremity, and was four inches long. There were no signs of gastric carcinoma or ulcer.

Clarke[a] reports the case of a Hindoo of twenty-two, under treatment for ague, who, without pain or vomiting, suddenly fell into collapse and died twenty-three hours later. He also mentions a case of rupture of the stomach of a woman of uncertain history, who was supposed to have died of cholera. The examination of the bodies of both cases showed true rupture of the stomach and not mere perforation. In both cases, at the time of rupture, the stomach was empty, and the gastric juice had digested off the capsules of the spleens, thus allowing the escape of blood into the abdominal cavities. The seats of rupture were on the anterior walls. In the first case the coats of the stomach were atrophied and thin. In the second the coats were healthy and not even softened. There was absence of softening, erosion, or rupture on the posterior walls.

As illustrative of the amount of paralytic distention that is possible, Bamberger mentions a case in which 70 pounds of fluid filled the stomach.

Voluntary Vomiting.—It is an interesting fact that some persons exhibit the power of contracting the stomach at will and expeling its contents without nausea. Montégre[b] mentions a distinguished member of the Faculty of Paris, who, by his own volition and without nausea or any violent efforts, could vomit the contents of his stomach. In his translation of "Spallanzani's Experiments on Digestion" Sennebier reports a similar instance in Geneva, in which the vomiting was brought about by swallowing air.

In discussing **wounds** and other injuries **of the stomach** no chapter would be complete without a description of the celebrated case of **Alexis St. Martin,** whose accident has been the means of contributing so much to the knowledge of the physiology of digestion. This man was a French Canadian of good constitution, robust and healthy, and was employed as a voyageur by the American Fur Company. On June 16, 1822, when about eighteen years of age, he was accidentally wounded by a discharge from a musket. The contents of the weapon, consisting of powder and duck-shot, entered his left side from a distance of not more than a yard off. The charge was directed obliquely forward and inward, literally blowing off the integument and muscles for a space about the size of a man's hand, carrying away the anterior half of the 6th rib, fracturing the 5th rib, lacerating the lower portion of the lowest lobe of the left lung, and perforating the diaphragm and the stomach. The whole mass of the discharge together with fragments of clothing were driven into the muscles and cavity of the chest. When first seen

[a] 435, Aug., 1885. [b] 302, iv., 188.

by Dr. Beaumont about a half hour after the accident, a portion of the lung, as large as a turkey's egg was found protruding through the external wound. The protruding lung was lacerated and burnt. Immediately below this was another protrusion, which proved to be a portion of the stomach, lacerated through all its coats. Through an orifice, large enough to admit a fore-finger, oozed the remnants of the food he had taken for breakfast. His injuries were dressed; extensive sloughing commenced, and the wound became considerably enlarged. Portions of the lung, cartilages, ribs, and of the ensiform process of the sternum came away. In a year from the time of the accident, the wound, with the exception of a fistulous aperture of the stomach and side, had completely cicatrized. This aperture was about 2½ inches in circumference, and through it food and drink constantly extruded unless prevented by a tent-compress and bandage. The man had so far recovered as to be able to walk and do light work, his digestion and appetite being normal. Some months later a small fold or doubling of the stomachal coats slightly protruded until the whole aperture was filled, so as to supersede the necessity of a compress, the protruding coats acting as a valve when the stomach was filled. This valvular protrusion was easily depressed by the finger. St. Martin suffered little pain except from the depression of the skin. He took his food and drink like any healthy person, and for eleven years remained under Dr. Beaumont's own care in the Doctor's house as a servant. During this time were performed the experiments on digestion which are so well known. St. Martin was at all times willing to lend himself in the interest of physiologic science. In August, 1879, The Detroit Lancet contains advices that St. Martin was living at that time at St. Thomas, Joliette County, Province of Quebec, Canada. At the age of seventy-nine he was comparatively strong and well, and had always been a hard worker. At this time the opening in the stomach was nearly an inch in diameter, and in spite of its persistence his digestion had never failed him.

Spizharny[a] relates a remarkable case of **gastric fistula in the loin,** and collects 61 cases of gastric fistula, none of which opened in the loin. The patient was a girl of eighteen, who had previously had perityphlitis, followed by abscesses about the navel and lumbar region. Two fistulæ were found in the right loin, and were laid open into one canal, which, after partial resection of the 12th rib, was dilated and traced inward and upward, and found to be in connection with the stomach. Food was frequently found on the dressings, but with the careful use of tampons a cure was effected.

In the olden times wounds of the stomach were not always fatal. The celebrated anatomist, Fallopius, successfully treated two cases in which the stomach was penetrated so that food passed through the wound. Jacobus Orthaeus tells us that in the city of Fuldana there was a soldier who received a wound of the stomach, through which food passed immediately after being

[a] 704, 1893.

swallowed; he adds that two judicious surgeons stitched the edges of the wound to the integuments, thereby effecting a cure. There is another old record[570] of a gastric fistula through which some aliment passed during the period of eleven years.

Archer[a] tells of a man who was stabbed by a negro, the knife entering the cartilages of the 4th rib on the right side, and penetrating the stomach to the extent of two inches at a point about two inches below the xiphoid cartilage. The stomachal contents, consisting of bacon, cabbage, and cider, were evacuated. Shortly after the reception of the injury, an old soldier sewed up the wound with an awl, needle, and wax-thread; Archer did not see the patient until forty-eight hours afterward, at which time he cleansed and dressed the wound. After a somewhat protracted illness the patient recovered, notwithstanding the extent of injury and the primitive mode of treatment.

Travers[b] mentions the case of a woman of fifty-three who, with suicidal intent, divided her abdominal parietes below the navel with a razor, wounding the stomach in two places. Through the wound protruded the greater part of the larger curvature of the stomach; the arch of the colon and the entire greater omentum were both strangulated. A small portion of the coats of the stomach, including the wound, was nipped up, a silk ligature tied about it, and the entrails replaced. Two months afterward the patient had quite recovered, though the ligature of the stomach had not been seen in the stool. Clements[c] mentions a robust German of twenty-two who was stabbed in the abdomen with a dirk, producing an incised wound of the stomach. The patient recovered and was returned to duty the following month.

There are many cases on record in which injury of the stomach has been due to some mistake or accident in the juggling process of knife-swallowing or sword-swallowing. The records of injuries of this nature extend back many hundred years, and even in the earlier days the delicate operation of **gastrotomy,** sometimes with a successful issue, was **performed upon persons who had swallowed knives.** Gross mentions that in 1502 Florian Mathias of Bradenberg removed a knife nine inches long from the stomach of a man of thirty-six, followed by a successful recovery. Glandorp,[380] from whom, possibly, Gross derived his information, relates this memorable case as being under the direction of Florianus Matthaesius of Bradenburg. The patient, a native of Prague, had swallowed a knife eight or nine inches long, which lay pointing at the superior portion of the stomach. After it had been lodged in this position for seven weeks and two days gastrotomy was performed, and the knife extracted; the patient recovered. In 1613 Crollius reports the case of a Bohemian peasant who had concealed a knife in his mouth, thinking no one would suspect he possessed the weapon; while he was excited it slipped into the stomach, from whence it subsequently penetrated through to the skin; the man recovered. There is another old case of a man at Prague who swallowed

[a] 541, 1812. [b] 317, 1836, i., 81. [c] 847, 91.

a knife which some few weeks afterward made its exit from an abdominal abscess. Gooch[382] quotes the case of a man, belonging to the Court of Paris, who, nine months after swallowing a knife, voided it at the groin. In the sixteenth century Laurentius Joubert relates a similar case, the knife having remained in the body two years. De Diemerbroeck[304] mentions the fact that a knife ten inches long was extracted by gastrotomy, and placed among the rarities in the anatomic chamber of the University at Leyden. The operation was done in 1635 at Koenigsberg, by Schwaben, who for his surgical prowess was appointed surgeon to the King of Poland. The patient lived eight years after the operation.

It is said that in 1691, while playing tricks with a knife 6½ inches long, a country lad of Saxony swallowed it, point first. He came under the care of Weserern, physician to the Elector of Brandenburgh, who successfully extracted it, two years and seven months afterward, from the pit of the lad's stomach. The horn haft of the knife was considerably digested. In 1720 Hubner[a] of Rastembourg operated on a woman who had swallowed an open knife. After the incision it was found that the knife had almost pierced the stomach and had excited a slight suppuration. After the operation recovery was very prompt.

Bell[b] of Davenport, Iowa, performed gastrotomy on a man, who, while attempting a feat of legerdemain, allowed a bar of lead, 10⅛ inches long, 1½ inches wide, and 9½ ounces in weight, to slip into his stomach. The bar was removed and the patient recovered. Gussenbauer[c] gives an account of a juggler who turned his head to bow an acknowledgment of applause while swallowing a sword; he thus brought his upper incisors against the sword, which broke off and slipped into his stomach. To relieve suffocation the sword was pushed further down. Gastrotomy was performed, and the piece of sword 11 inches long was extracted; as there was perforation of the stomach before the operation, the patient died of peritonitis.

An hour after ingestion, Bernays of St. Louis successfully removed a knife 9½ inches long. By means of an army-bullet forceps the knife was extracted easily through an incision ⅝ inch long in the walls of the stomach. Gross[d] speaks of a man of thirty who was in the habit of giving exhibitions of sword-swallowing in public houses, and who injured his esophagus to such an extent as to cause abscess and death. In the Journal of the American Medical Association, March 1, 1896, there is an extensive list of gastrotomies performed for the removal of knives and other foreign bodies, from the seventeenth century to the present time.

The physiologic explanation of sword-swallowing is quite interesting. We know that when we introduce the finger, a spoon, brush, etc., into the throat of a patient, we cause extremely disagreeable symptoms. There is nausea, gagging, and considerable hindrance with the function of respira-

[a] 641, 218. [b] Quoted 362, 1880. [c] 821, Dec. 20 and 27, 1883. [d] 476, 1885, i., 249.

tion. It therefore seems remarkable that there are people whose physiologic construction is such that, without apparent difficulty, they are enabled to swallow a sword many inches long. Many of the exhibitionists allow the visitors to touch the stomach and outline the point of the sabre through the skin. The sabre used is usually very blunt and of rounded edges, or if sharp, a guiding tube of thin metal is previously swallowed. The explanation of these exhibitions is as follows: The instrument enters the mouth and pharynx, then the esophagus, traverses the cardiac end of the stomach, and enters the latter as far as the antrum of the pylorus, the small culdesac of the stomach. In their normal state in the adult these organs are not in a straight line, but are so placed by the passage of the sword. In the first place the head is thrown back, so that the mouth is in the direction of the esophagus, the curves of which disappear or become less as the sword proceeds (Fig. 221); the angle that the esophagus makes with the stomach is obliterated, and finally the stomach is distended in the vertical diameter and its internal curve disappears, thus permitting the blade to traverse the greater diameter of the stomach. According to Guyot-Daubès,[394] these organs, in a straight line, extend a distance of from 55 to 62 cm., and consequently the performer is enabled to swallow an instrument of this length. The length is divided as follows:—

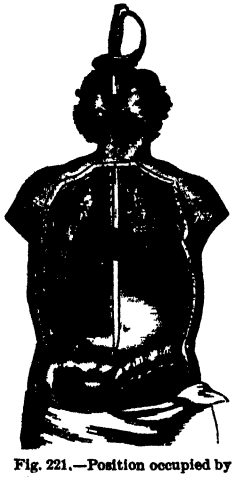


Fig. 221.—Position occupied by the blade in the body of a sword-swallower (after Guyot-Daubès).

Mouth and pharynx,	10 to 12 cm.
Esophagus,	25 to 28 cm.
Distended stomach,	20 to 22 cm.
	55 to 62 cm.

These acrobats with the sword have rendered important service to medicine. It was through the good offices of a sword-swallower that the Scotch physician, Stevens, was enabled to make his experiments on digestion. He caused this assistant to swallow small metallic tubes pierced with holes. They were filled, according to Reaumur's method, with pieces of meat. After a certain length of time he would have the acrobat disgorge the tubes, and in this way he observed to what degree the process of digestion had taken place. It was also probably the sword-swallower who showed the physicians to what extent the pharynx could be habituated to contact, and from this resulted the invention of the tube of Faucher, the esophageal sound, lavage of the stomach, and illumination of this organ by electric light. Some of these individuals also have the faculty of swallowing several pebbles, as large even as hen's eggs, and of disgorging them one by one by simple contractions of the stomach.

From time to time individuals are seen who possess the power of **swallowing pebbles, knives, bits of broken glass, etc.**, and, in fact, there have been recent tricky exhibitionists who claimed to be able to swallow **poisons**, in large quantities, with impunity. Henrion, called "Cassandra," a celebrated example of this class, was born at Metz in 1761. Early in life he taught himself to swallow pebbles, sometimes whole and sometimes after breaking them with his teeth. He passed himself off as an American savage; he swallowed as many as 30 or 40 large pebbles a day, demonstrating the fact by percussion on the epigastric region. With the aid of salts he would pass the pebbles and make them do duty the next day. He would also swallow live mice and crabs with their claws cut. It was said that when the mice were introduced into his mouth, they threw themselves into the pharynx where they were immediately suffocated and then swallowed. The next morning they would be passed by the rectum flayed and covered with a mucous substance. Henrion continued his calling until 1820, when, for a moderate sum, he was induced to swallow some nails and a plated iron spoon 5½ inches long and one inch in breadth. He died seven days later.[a]

According to Bonet, there was a man by the name of Pichard who swallowed a razor and two knives in the presence of King Charles II. of England, the King himself placing the articles into the man's mouth. In 1810 Babbington and Curry[302] are accredited with citing the history of an American sailor in Guy's Hospital, London, who frequently swallowed penknives for the amusement of his audiences. At first he swallowed four, and three days later passed them by the anus; on another occasion he swallowed 14 of different sizes with the same result. Finally he attempted to gorge himself with 17 penknives, but this performance was followed by horrible pains and alarming abdominal symptoms. His excrement was black from iron. After death the cadaver was opened and 14 corroded knives were found in the stomach, some of the handles being partly digested; two were found in the pelvis and one in the abdominal cavity. Paré[618] recalls the instance of a shepherd who suffered distressing symptoms after gulping a knife six inches long. Afterward the knife was abstracted from his groin. Fabricius Hildanus[834] cites a somewhat similar case.

Early in the century there was a man known as the "Yankee knife-swallower," whose name was John Cummings, an American sailor, who had performed his feats in nearly all the ports of the world. One of his chief performances was swallowing a billiard ball. Poland[b] mentions a man (possibly Cummings) who, in 1807, was admitted to Guy's Hospital with dyspeptic symptoms which he attributed to knife-swallowing. His story was discredited at first; but after his death, in March, 1809, there were 30 or 40 fragments of knives found in his stomach. One of the back-springs on a knife had transfixed the colon and rectum. In the Edinburgh Philosophical

[a] 162, 1839. [b] 392, 1864.

Journal for 1825 [a] there is an account of a juggler who swallowed a knife which remained in his stomach and caused such intense symptoms that gastrotomy was advised; the patient, however, refused operation.

Drake [b] reports a curious instance of polyphagia. The person described was a man of twenty-seven who pursued the vocation of a "sword-swallower." He had swallowed a gold watch and chain with a seal and key attached; at another time he swallowed 34 bullets and voided them by the anus. At Poughkeepsie, N. Y., in August, 1819, in one day and night he swallowed 19 pocket-knives and 41 copper cents. This man had commenced when a lad of fifteen by swallowing marbles, and soon afterward a small penknife. After his death his esophagus was found normal, but his stomach was so distended as to reach almost to the spine of the ilium, and knives were found in the stomach weighing one pound or more. In his exhibitions he allowed his spectators to hear the click of the knives and feel them as low down as the anterior superior spine of the ilium.

The present chief of the dangerous "profession" of sword-swallowing is Chevalier Cliquot, a French Canadian by birth, whose major trick is to swallow a real bayonet sword, weighted with a cross-bar and two 18-pound dumb-bells. He can swallow without difficulty a 22-inch cavalry sword; formerly, in New York, he gave exhibitions of swallowing fourteen 19-inch bayonet swords at once. A negro, by the name of Jones, exhibiting not long since in Philadelphia, gave hourly exhibitions of his ability to swallow with impunity pieces of broken glass and china.

Foreign Bodies in the Alimentary Canal.—In the discussion of the foreign bodies that have been taken into the stomach and intestinal tract possibly the most interesting cases, although the least authentic, are those relating to **living animals,** such as fish, insects, or reptiles. It is particularly among the older writers that we find accounts of this nature. In the Ephemerides we read of a man who vomited a serpent that had crept into his mouth, and of another person who ejected a beetle that had gained entrance in a similar manner. From the same authority we find instances of the vomiting of live fish, mice, toads, and also of the passage by the anus of live snails and snakes. Frogs vomited are mentioned by Bartholinus, Dolæus, Hellwigius, Lentilus, Salmuth, and others.[706] A Vege mentions a man who swallowed a young chicken whole. Paullini speaks of a person who, after great pain, vomited a mouse which he had swallowed. Borellus, Bartholinus, Thoner, and Viridet, are among the older authorities mentioning persons who swallowed toads. Hippocrates speaks of asphyxia from a serpent which had crawled into the mouth.

Borellus states that he knew a case of a person who vomited a salamander. Plater[635] reports the swallowing of eels and snails. Rhodius mentions persons who have eaten scorpions and spiders with impunity. Planchon [c]

[a] 641, 187. [b] 541, 1822, 78. [c] 462, T. lv., 203.

writes of an instance in which a live spider was ejected from the bowel; and Colini[a] reports the passage of a live lizard which had been swallowed two days before, and there is another similar case on record.[b] Marcellus Donatus[c] records an instance in which a viper, which had previously crawled into the mouth, had been passed by the anus. There are also recorded instances in French literature in which persons affected with pediculosis, have, during sleep, unconsciously swallowed lice which were afterward found in the stools.

There is an abundance of cases in which leeches have been accidentally swallowed. Pliny, Aetius, Dioscorides, Scribonius-Largus, Celsus, Oribasius, Paulus Aegineta, and others, describe such cases. Bartholinus speaks of a Neapolitan prince who, while hunting, quenched his thirst in a brook, putting his mouth in the running water. In this way he swallowed a leech, which subsequently caused annoying hemorrhage from the mouth. Timaeus mentions a child of five who swallowed several leeches, and who died of abdominal pains, hemorrhage, and convulsions. Rhodius, Riverius, and Zwinger make similar observations. According to Baron Larrey the French soldiers in Napoleon's Egyptian campaign occasionally swallowed leeches. Grandchamp and Duval[d] have commented on curious observations of leeches in the digestive tract. Dumas and Marques also speak of the swallowing of leeches. Colter[e] reports a case in which beetles were vomited. Wright[f] remarks on Banon's case of fresh-water shrimps passed from the human intestine. Dalton, Dickman,[g] and others, have discussed the possibility of a slug living in the stomach of man. Pichells[h] speaks of a case in which beetles were expelled from the stomach; and Pigault[i] gives an account of a living lizard expelled by vomiting. Fontaine, Gaspard, Vetillart, Ribert, MacAlister,[j] and Waters[k] record cases in which living caterpillars have been swallowed.

Sundry Cases.—The variety of foreign bodies that have been swallowed either accidentally or for exhibitional or suicidal purposes is enormous. Nearly every imaginable article from the minutest to the most incredible size has been reported. To begin to epitomize the literature on this subject would in itself consume a volume, and only a few instances can be given here, chosen in such a way as to show the variety, the effects, and the possibilities of their passage through the intestinal canal.

Chopart[l] says that in 1774 the belly of a ravenous galley-slave was opened, and in the stomach were found **52 foreign bodies,** including a barrel-hoop 19 inches long, nails, pieces of pipe, spoons, buckles, seeds, glass, and a knife. In the intestines of a person Agnew[m] found a pair of suspenders, a mass of straw, and three roller-bandages, an inch in width and diameter. Velpeau[n] mentions

[a] 462, T. li., 460. [b] 107, i., 22. [c] 306, ii., c. xii., 222. [d] 458, T. xxv. and xxvi.
[e] 548, 1878, i., 676. [f] 312, 1864, li., 407. [g] 476, 1859, ii., 337. [h] 318, lxvi., 384.
[i] Quart. Jour. Calcutta Med. and Phys. Soc., 1837, i., 291. [j] 312, liv., 478.
[k] 538, xxix., 93. [l] "Maladies des Voies Urinaires." [m] 526, 1853. [n] 476, 1849, ii., 41.

a fork which was passed from the anus twenty months after it was swallowed. Wilson [a] mentions an instance of gastrotomy which was performed for the extraction of a fork swallowed sixteen years before. There is an interesting case [b] in which, in a delirium of typhoid fever, a girl of twenty-two swallowed two iron forks, which were subsequently expelled through an abdominal abscess. A French woman of thirty-five,[c] with suicidal intent, swallowed a four-pronged fork, which was removed four years afterward from the thigh. For two years she had suffered intense pain in both thighs. In the Royal College of Surgeons in London there is a steel button-hook 3½ inches in length which was accidentally swallowed, and was passed three weeks later by the anus, without having given rise to any symptom.[619]

Among the insane a favorite trait seems to be swallowing nails. In the Philosophical Transactions [d] is an account of the contents of the stomach of an idiot who died at thirty-three. In this organ were found nine cart-wheel nails, six screws, two pairs of compasses, a key, an iron pin, a ring, a brass pommel weighing nine ounces, and many other articles. The celebrated Dr. Lettsom, in 1802, spoke of an idiot who swallowed **four pounds of old nails** and a pair of compasses. A lunatic in England [e] swallowed ten ounces of screws and bits of crockery, all of which were passed by the anus. Boardman [f] gives an account of a child affected with hernia who swallowed a nail 2½ inches long. In a few days the nail was felt in the hernia, but in due time it was passed by the rectum. Blower [g] reports an account of a nail passing safely through the alimentary canal of a baby. Armstrong [h] mentions an insane hair-dresser of twenty-three, in whose stomach after death were found **30 or more spoon handles, 30 nails,** and other minor articles.

Closmadenc [363] reported a remarkable case which was extensively quoted.[i] The patient was an hysteric young girl, an inmate of a convent, to whom he was called to relieve a supposed fit of epilepsy. He found her half-asphyxiated, and believed that she had swallowed a foreign body. He was told that under the influence of exaggerated religious scruples this girl inflicted penance upon herself by swallowing earth and holy medals. At the first dose of the emetic, the patient made a strong effort to vomit, whereupon a cross seven cm. long appeared between her teeth. This was taken out of her mouth, and with it an enormous **rosary 220 cm.** long, and having seven medals attached to it. Hunt [j] recites a case occurring in a pointer dog, which swallowed its **collar and chain,** only imperfectly masticating the collar. The chain and collar were immediately missed and search made for them. For several days the dog was ill and refused food. Finally the gamekeeper saw the end of the chain hanging from the dog's anus, and taking hold of it, he drew out a yard of chain with links one inch long, with a

[a] 476, 1887, i., 1109. [b] Neue Jahrbücher der deutschen Medizin und Chirurgie, 1823.
[c] 593, 1853. [d] 629, 1700–20, v. [e] 476, 1866, i., 619. [f] 230, 1867.
[g] 224, 1870. [h] 476, 1852. [i] 548, 1859, ii., 273. [j] 476, 1872, ii., 837.

cross bar at the end two inches in length; the dog soon recovered. The collar was never found, and had apparently been digested or previously passed.

Fear of robbery has often led to the swallowing of **money or jewelry.** Vaillant, the celebrated doctor and antiquarian, after a captivity of four months in Algiers, was pursued by Tunis pirates, and swallowed 15 medals of gold; shortly after arriving at Lyons he passed them all at stool. Fournier and Duret[a] published the history of a galley slave at Brest in whose stomach were found 52 pieces of money, their combined weight being one pound, 10¼ ounces. On receiving a sentence of three years' imprisonment, an Englishman,[b] to prevent them being taken from him, swallowed seven half-crowns. He suffered no bad effects, and the coins not appearing the affair was forgotten. While at stool some twenty months afterward, having taken a purgative for intense abdominal pain, the seven coins fell clattering into the chamber. Hévin mentions the case of a man who, on being captured by Barbary pirates, swallowed all the money he had on his person. It is said that a certain Italian swallowed 100 louis d'ors at a time.

It occasionally happens that **false teeth** are accidentally swallowed, and even passed through the intestinal tract. Easton[c] mentions a young man who accidentally swallowed some artificial teeth the previous night, and, to further their passage through the bowel, he took a dose of castor oil. When seen he was suffering with pain in the stomach, and was advised to eat much heavy food and avoid aperients. The following day after several free movements he felt a sharp pain in the lower part of his back. A large enema was given and the teeth and plate came away. The teeth were cleansed and put back in his mouth, and the patient walked out. Nine years later the same accident again happened to the man but in spite of treatment nothing was seen of the teeth for a month afterward, when a body appeared in the rectum which proved to be a gold plate with the teeth in it. In The Lancet of December 10, 1881, there is an account of a vulcanite tooth-plate which was swallowed and passed forty-two hours later. Billroth[d] mentions an instance of gastrotomy for the removal of swallowed artificial teeth, with recovery; and another case in which a successful esophagotomy was performed. Gardiner[e] mentions a woman of thirty-three who swallowed two false teeth while supping soup. A sharp angle of the broken plate had caught in a fold of the cardiac end of the stomach and had caused violent hematemesis. Death occurred seventeen hours after the first urgent symptoms.

In the Museum of the Royal College of Surgeons in London there is an intestinal concretion weighing 470 grains, which was passed by a woman of seventy who had suffered from constipation for many years. Sixteen years

[a] 462, T. xlii. [b] 490, May 20, 1837. [c] 476, 1882, i., 381.
[d] 476, 1885, i., 591. [e] 253, March, 1881.

before the concretion was passed she was known to have swallowed a tooth. At one side of the concretion a piece had been broken off exposing an incisor tooth which represented the nucleus of the formation. Manasse[199] recently reported the case of a man of forty-four whose stomach contained a stone weighing 75 grams. He was a joiner and, it was supposed, habitually drank some alcoholic solution of shellac used in his trade. Quite likely the shellac had been precipitated in the stomach and gave rise to the calculus.

Berwick[a] mentions a child of eight months who was playing with a detached **organ-handle,** and put it in its mouth. Seeing this the mother attempted to secure the handle, but it was pushed into the esophagus. A physician was called, but nothing was done, and the patient seemed to suffer little inconvenience. Three days later the handle was expelled from the anus. Teakle[b] reports the successful passage through the alimentary canal of the **handle of a music-box.** Hashimoto, Surgeon-General of the Imperial Japanese Army, tells of a woman of forty-nine who was in the habit of inducing vomiting by irritating her fauces and pharynx with a Japanese **tooth-brush**—a wooden instrument six or seven inches long with bristles at one end. In May, 1872, she accidentally swallowed this brush. Many minor symptoms developed, and in eleven months there appeared in the epigastric region a fluctuating swelling, which finally burst, and from it extended the end of the brush. After vainly attempting to extract the brush the attending physician contented himself with cutting off the projecting portion. The opening subsequently healed; and not until thirteen years later did the pain and swelling return. On admission to the hospital in October, 1888, two fistulous openings were seen in the epigastric region, and the foreign body was located by probing. Finally, on November 19, 1888, the patient was anesthetized, one of the openings enlarged, and the brush extracted. Five weeks later the openings had all healed and the patient was restored to health.

Garcia[c] reports an interesting instance of foreign body in a man between forty-five and fifty. This man was afflicted with a syphilitic affection of the mouth, and he constructed a **swab ten inches long** with which to cleanse his fauces. While making the application alone one day, a spasmodic movement caused him to relinquish his grasp on the handle, and the swab disappeared. He was almost suffocated, and a physician was summoned; but before his arrival the swab had descended into the esophagus. Two weeks later, gastroperitoneal symptoms presented, and as the stick was located, gastrotomy was proposed; the patient, however, would not consent to an operation. On the twenty-sixth day an abscess formed on the left side below the nipple, and from it was discharged a large quantity of pus and blood. Four days after this, believing himself to be better, the man began to redress the wound, and from it he saw the end of a stick protruding. A physician was called, and by traction the stick was withdrawn from between the 3d and 4th ribs;

[a] 224, 1890, i., 1367. [b] 510, 1884. [c] 640, June, 1854.

forty-nine days after the accident the wound had healed completely. Two years afterward the patient had an attack of cholera, but in the fifteen subsequent years he lived an active life of labor.

Occasionally an enormous mass of **hair** has been removed from the stomach. A girl of twenty[a] with a large abdominal swelling was admitted to a hospital. Her illness began five years previously, with frequent attacks of vomiting, and on three occasions it was noticed that she became quite bald. Abdominal section was performed, the stomach opened, and from it was removed a mass of hair which weighed five pounds and three ounces. A good recovery ensued. In the Museum of St. George's Hospital, London,[619] are masses of hair and string taken from the stomach and duodenum of a girl of ten. It is said that from the age of three the patient had been in the habit of eating these articles. There is a record in the last century of a boy of sixteen who ate all the hair he could find; after death his stomach and intestines were almost completely lined with hairy masses. In the Journal of the American Medical Association, March 1, 1896, there is a report of a case of hair-swallowing.

Foreign Bodies in the Intestines.—White[b] relates the history of a case in which a silver spoon was swallowed and successfully excised from the intestinal canal. Houston[c] mentions a maniac who swallowed a rusty iron spoon 11 inches long. Fatal peritonitis ensued and the spoon was found impacted in the last acute turn of the duodenum. In 1895, in London,[619] there was exhibited a specimen, including the end of the ileum with the adjacent end of the colon, showing a dessertspoon which was impacted in the latter. The spoon was seven inches long, and its bowl measured 1½ inches across. There was much ulceration of the mucous membrane. This spoon had been swallowed by a lunatic of twenty-two, who had made two previous ineffectual attempts at suicide. Mason[d] describes the case of a man of sixty-five who, after death by strangulated hernia, was opened, and two inches from the ileocecal valve was found an earthen egg-cup which he had swallowed. Mason also relates the instance of a man who swallowed metal balls 2½ inches in diameter; and the case of a Frenchman who, to prevent the enemy from finding them, swallowed a box containing despatches from Napoleon. He was kept prisoner until the despatches were passed from his bowels. Denby[e] discovered a large egg-cup in the ileum of a man. Fillion[f] mentions an instance of recovery following the perforation of the jejunum by a piece of horn which had been swallowed. Madden[g] tells of a person, dying of intestinal obstruction, in whose intestines were found several ounces of crude mercury and a plum-stone. The mercury had evidently been taken for purgative effect. Rodenbaugh[h] mentions a most interesting case of beans sprouting while in the bowel. Harrison[i] relates a curious case in which the swallowed

[a] 476, 1895, i., 1581.
[b] 541, 1807, iv., 367.
[c] 311, 1830, v., 319.
[d] 476, 1870, i., 701.
[e] 476, 1834.
[f] 462, T. lxiii., 538.
[g] 629, 1732.
[h] 613, 1876.
[i] 476, 1883, i., 863.

lower epiphysis of the femur of a rabbit made its way from the bowel to the bladder, and was discharged thence by the urethra.

In cases of appendicitis **foreign bodies** have been found lodged **in or about the vermiform appendix** so often that it is quite a common lay idea that appendicitis is invariably the result of the lodgment of some foreign body accidentally swallowed. In recent years the literature of this subject proves that a great variety of foreign bodies may be present. A few of the interesting cases will be cited in the following lines:—

In the New England Medical Journal, 1843, is an account of a vermiform appendix which was taken from the body of a man of eighty-eight who had died of pneumothorax. During life there were no symptoms of disease of the appendix, and after death no adhesions were found, but this organ was remarkably long, and in it were found 122 robin-shot. The old gentleman had been excessively fond of birds all his life, and was accustomed to bolt the meat of small birds without properly chewing it; to this fact was attributed the presence of these shot in the appendix. A somewhat similar case[a] was that of a man who died in the Hôtel-Dieu in 1833. The ileum of this man contained 92 shot and 120 plum stones. Buckler[b] reports a case of appendicitis in a child of twelve, in which a common-sized bird-shot was found in the appendix. Packard[c] presented a case of appendicitis in which two pieces of rusty and crooked wire, one 2½ and the other 1½ inches long, were found in the omentum, having escaped from the appendix. Howe[d] describes a case in which a double oat, with a hard envelope, was found in the vermiform appendix of a boy of four years and one month of age. Prescott[e] reports a case of what he calls fatal colic from the lodgment of a chocolate-nut in the appendix; and Noyes[f] relates an instance of death in a man of thirty-one attributed to the presence of a raisin-seed in the vermiform appendix. Needles, pins, peanuts, fruit-stones, peas, grape-seeds, and many similar objects have been found in both normal and suppurative vermiform appendices.

Intestinal Injuries.—The degree of injury that the intestinal tract may sustain, and after recovery perform its functions as usual, is most extraordinary; and even when the injury is of such an extent as to be mortal, the persistence of life is remarkable. It is a well known fact that in bull-fights, after mortal injuries of the abdomen and bowels, horses are seen to struggle on almost until the sport is finished. Fontaine[g] reports a case of a Welsh quarryman who was run over by a heavy four-horse vehicle. The stump of a glass bottle was crushed into the intestinal cavity, and the bowels protruded and were bruised by the wheels of the wagon. The grit was so firmly ground into the bowel that it was impossible to remove it; yet the man made a complete re-

[a] 368, 1834.
[b] 810, 1856, vii., 266.
[c] "Proceedings Patholog. Soc. of Phila.," 1858, i., 170.
[d] 218, 1860, lxiii., 231.
[e] 589, 1815, iv., 221.
[f] 299, 1875, x., 30.
[g] 681, 1875, xix., 109.

covery. Nicolls[a] has the case of a man of sixty-nine, a workhouse maniac, who on August 20th attempted suicide by running a red-hot poker into his abdomen. His wound was dressed and he was recovering, but on September 11th he tore the cast off his abdomen, and pulled out of the wound the omentum and 32 inches of colon, which he tore off and threw between his pallet and the wall. Strange to say he did not die until eight days after this horrible injury.

Tardieu[b] relates the case of a chemist who removed a large part of the mesentery with a knife, and yet recovered. Delmas of Montpellier reports the history of a wagoner with complete rupture of the intestines and rupture of the diaphragm, and who yet finished his journey, not dying until eighteen hours after.

Successful Intestinal Resection.—In 1755 Nedham[c] of Norfolk reported the case of a boy of thirteen who was run over and eviscerated. It was found necessary to remove 57 inches of the protruding bowel, but the boy made a subsequent recovery. Koebererle[d] of Strasburg performed an operation on a woman of twenty-two for the relief of intestinal obstruction. On account of numerous strictures it was found necessary to remove over two yards of the small intestine; the patient recovered without pain or trouble of any kind. In his dissertation on "Ruptures" Arnaud remarks that he cut away more than seven feet of gangrenous bowel, his patient surviving. Beehe[e] reports recovery after the removal of 48 inches of intestine. The case was one of strangulation of an umbilical hernia.

Sloughing of the Intestine Following Intussusception.—Lobstein[488] mentions a peasant woman of about thirty who was suddenly seized with an attack of intussusception of the bowel, and was apparently in a moribund condition when she had a copious stool, in which she evacuated three feet of bowel with the mesentery attached. The woman recovered, but died five months later from a second attack of intussusception, the ileum rupturing and peritonitis ensuing. There is a record in this country[f] of a woman of forty-five who discharged 44 inches of intestine, and who survived for forty-two days. The autopsy showed the sigmoid flexure gone, and from the caput ceci to the termination the colon only measured 14 inches. Vater[g] gives a history of a penetrating abdominal wound in which a portion of the colon hung from the wound during fourteen years, forming an artificial anus.

Among others mentioning considerable sloughing of intestine following intussusception, and usually with complete subsequent recovery, are Bare,[h] 13 inches of the ileum; Blackton,[i] nine inches; Bower,[j] 14 inches; Dawson,[k] 29 inches; Sheldon,[l] 4½ feet; Stanley,[m] three feet; Tremaine,[n] 17 inches; and Grossoli,[o] 40 cm.

[a] 312, 1854, xxxii., 214. [b] 141, xxxix., 157. [c] 629, 1755, xlix., part i., 238.
[d] 545, 1881. [e] Trans. Amer. Inst. Homeop., 1870, Chicago, 871. [f] 124, 1846.
[g] 629, 1719–33. [h] 124, 1863. [i] 548, 1853. [j] 149, 1803. [k] 817, 1840.
[l] 546, 1850. [m] 426, 1826. [n] 252, 1879. [o] 746, 1875.

Rupture of the Intestines.—It is quite possible for the intestine to be ruptured by external violence, and cases of rupture of all parts of the bowel have been recorded. Titorier [a] gives the history of a case in which the colon was completely separated from the rectum by external violence. Hinder [b] reports the rupture of the duodenum by a violent kick. Eccles,[c] Ely,[d] and Pollock [e] also mention cases of rupture of the duodenum. Zimmerman,[f] Atwell,[g] and Allan [h] report cases of rupture of the colon.

Operations upon the gastrointestinal tract have been so improved in the modern era of antisepsis that at the present day they are quite common. There are so many successful cases on record that the whole subject deserves mention here.

Gastrostomy is an operation for establishing a fistulous opening in the stomach through the anterior wall. Many operations have been devised, but the results of this maneuver in malignant disease have not thus far been very satisfactory. It is quite possible that, being an operation of a serious nature, it is never performed early enough, the patient being fatally weakened by inanition. Gross and Zesas [i] have collected, respectively, 207 and 162 cases with surprisingly different rates of mortality: that of Gross being only 29.47 per cent., while that of Zesas was for cicatricial stenoses 60 per cent., and for malignant cases 84 per cent. It is possible that in Zesas's statistics the subjects were so far advanced that death would have resulted in a short time without operation. Gastrotomy we have already spoken of.

Pyloroplasty is an operation devised by Heineke and Mikulicz, and is designed to remove the mechanic obstruction in cicatricial stenoses of the pylorus, at the same time creating a new pylorus.

Gastroenterostomy and pylorectomy are operations devised for the relief of malignant disease of the pylorus, the diseased portions being removed and the parts resected.

Gastrectomy or extirpation of the stomach is considered by most surgeons entirely unjustifiable, as there is seldom hope of cure or prospect of amelioration. La Tribune Médicale for January 16, 1895,[j] gives an abstract of Langenbuch's contribution upon **total extirpation of the stomach.** Three patients were treated, of whom two died. In the first case, on opening the abdominal cavity the stomach was found very much contracted, presenting extensive carcinomatous infiltration on its posterior surface. After division of the epiploön section was made at the pylorus and at the cardiac extremities; the portions removed represented seven-eighths of the stomach. The pylorus was stitched to the remains of the cardiac orifice, making a cavity about the size of a hen's egg. In this case a cure was accomplished in three weeks. The second case was that of a man in whom almost the entire stomach

[a] 463, xi. [b] 435, 1866. [c] 548, 1863. [d] 218, 1859. [e] 700, 1877.
[f] 827, 1840, 603. [g] Indiana Jour. of Med., Indianapolis, 1875.
[h] 476, 1878, ii., 332. [i] 845, 705. [j] 843, 246.

was removed, and the pyloric and cardiac ends were stitched together in the wound of the parietes. The third case was that of a man of sixty-two with carcinoma of the pylorus. After pylorectomy, the line of suture was confined with iodoform-gauze packing. Unfortunately the patient suffered with bronchitis, and coughing caused the sutures to give way; the patient died of inanition on the twenty-third day.

Enterostomy, or the formation of a fecal fistula above the ileocecal valve, was performed for the first time by Nélaton in 1840, but the mortality since 1840 has been so great that in most cases it is deemed inadmissible.

Colostomy, an operation designed to make a fistulous opening in any portion of the rectum, was first practised by Littre. In early times the mortality of inguinal colostomy was about five per cent., but has been gradually reduced until König reports 20 cases with only one death from peritonitis, and Cripps 26 cases with only one death.[a] This will always retain its place in operative surgery as a palliative and life-saving operation for carcinomatous stenosis of the lower part of the colon, and in cases of carcinoma of the rectum in which operation is not feasible.

Intestinal anastomosis, whereby two portions of a severed or resected bowel can be intimately joined, excluding from fecal circulation the portion of bowel which has become obstructed, was originally suggested by Maisonneuve, and was studied experimentally by von Hacken. Billroth resorted to it, and Senn modified it by substituting decalcified bone-plates for sutures.[b] Since that time, Abbe, Matas, Davis, Brokaw, Robinson, Stamm, Baracz, and Dawburn, have modified the material of the plates used, substituting catgut rings, untanned leather, cartilage, raw turnips, potatoes, etc. Recently, Murphy of Chicago has invented a button, which has been extensively used all over the world, in place of sutures and rings, as a means of anastomosis. Hardly any subject has had more discussion in recent literature than the merits of this ingenious contrivance.

Foreign Bodies in the Rectum.—Probably the most celebrated case of foreign body introduced into the rectum is the classic one mentioned by Hévin.[c] Some students introduced the frozen **tail of a pig** in the anus of a French prostitute. The bristles were cut short, and having prepared the passage with oil, they introduced the tail with great force into the rectum, allowing a portion to protrude. Great pain and violent symptoms followed; there was distressing vomiting, obstinate constipation, and fever. Despite the efforts to withdraw the tail, the arrangement of the bristles which allowed entrance, prevented removal. On the sixth day, in great agony, the woman applied to Marchettis, who ingeniously adopted the simple procedure of taking a long hollow reed, and preparing one of its extremities so that it could be introduced into the rectum, he was enabled to pass the reed entirely around the tail and to withdraw both. Relief was prompt, and the removal of the

[a] 845, 715. [b] 845, 720. [c] Quoted 641, 353.

foreign body was followed by the issue of stercoraceous matter which had accumulated the six days it had remained in situ.

Tuffet[302] is quoted as mentioning a farmer of forty-six who, in masturbation, introduced a barley-head into his urethra. It was found necessary to cut the foreign body out of the side of the glans. A year later he put in his anus a cylindric snuff-box of large size, and this had to be removed by surgical methods. Finally, a drinking goblet was used, but this resulted in death, after much suffering and lay treatment. In his memoirs of the old Academy of Surgery in Paris, Morand speaks of a monk who, to cure a violent colic, introduced into his fundament a **bottle** of *l'eau de la reine de Hongrie*, with a small opening in its mouth, by which the contents, drop by drop, could enter the intestine. He found he could not remove the bottle, and violent inflammation ensued. It was at last necessary to secure a boy with a small hand to extract the bottle. There is a record of a case [a] in which a tin cup or tumbler was pushed up the rectum and then passed into the colon where it caused gangrene and death. It was found to measure 3½ by 3½ by two inches. There is a French case [b] in which a preserve-pot three inches in diameter was introduced into the rectum, and had to be broken and extracted piece by piece.

Cloquet [c] had a patient who put into his rectum a beer glass and a **preserving pot.** Montanari removed from the rectum of a man a **mortar pestle** 30 cm. long, and Poulet[641] mentions a pederast who accidentally killed himself by introducing a similar instrument, 55 cm. long, which perforated his intestine. Studsgaard mentions that in the pathologic collection at Copenhagen there is a long, smooth **stone,** 17 cm. long, weighing 900 gm., which a peasant had introduced into his rectum to relieve prolapsus. The stone was extracted in 1756 by a surgeon named Frantz Dyhr. Jeffreys [d] speaks of a person who, to stop diarrhea, introduced into his rectum a piece of wood measuring seven inches.

There is a remarkable case recorded [e] of a stick in the anus of a man of sixty, the superior extremity in the right hypochondrium, the inferior in the concavity of the sacrum. The stick measured 32 cm. in length; the man recovered. It is impossible to comprehend this extent of straightening of the intestine without great twisting of the mesocolon. Tompsett [f] mentions that he was called to see a workman of sixty-five, suffering from extreme rectal hemorrhage. He found the man very feeble, without pulse, pale, and livid. By digital examination he found a hard body in the rectum, which he was sure was not feces. This body he removed with a polyp-forceps, and found it to be a cylindric candle-box, which measured six inches in circumference, 2¼ in length, and 1¼ in diameter. The removal was followed by a veritable flood of fecal material, and the man recovered. Lane [g] reports

[a] 218, 1855. [b] 297, T. iii., 177. [c] 446, 1844. [d] 476, 1868.
[e] 365, 1868. [f] 476, 1869, i., 448. [g] 224, May 9, 1874.

perforation of the rectum by the introduction of two large pieces of soap; there was coincident strangulated hernia.

Hunter[a] mentions a native Indian, a resident of Coorla, who had introduced a **bullock's horn** high up into his abdomen, which neither he nor his friends could extract. He was chloroformed and placed in the lithotomy position, his buttocks brought to the edge of the bed, and after dilatation of the sphincter, by traction with the fingers and tooth-forceps, the horn was extracted. It measured 11 inches long. The young imbecile had picked it up on the road, where it had been rendered extremely rough by exposure, and this caused the difficulty in extraction.

In Nelson's Northern Lancet, 1852,[582] there is the record of a case of a man at stool, who slipped on a cow's horn, which entered the rectum and lodged beyond the sphincter. It was only removed with great difficulty.

A convict at Brest[b] put up his rectum a **box of tools.** Symptoms of vomiting, meteorism, etc., began, and became more violent until the seventh day, when he died. After death, there was found in the transverse colon, a cylindric or conic box, made of sheet iron, covered with skin to protect the rectum and, doubtless, to aid expulsion. It was six inches long and five inches broad and weighed 22 ounces. It contained a piece of gun-barrel four inches long, a mother-screw steel, a screw-driver, a saw of steel for cutting wood four inches long, another saw for cutting metal, a boring syringe, a prismatic file, a half-franc piece and four one-franc pieces tied together with thread, a piece of thread, and a piece of tallow, the latter presumably for greasing the instruments. On investigation it was found that these conic cases were of common use, and were always thrust up the rectum base first. In excitement this prisoner had pushed the conic end up first, thus rendering expulsion almost impossible. Ogle[c] gives an interesting case of foreign body in the rectum of a boy of seventeen. The boy was supposed to be suffering with an abdominal tumor about the size of a pigeon's egg under the right cartilages; it had been noticed four months before. On admission to the hospital the lad was suffering with pain and jaundice; sixteen days later he passed a stick ten inches long, which he reluctantly confessed that he had introduced into the anus. During all his treatment he was conscious of the nature of his trouble, but he suffered rather than confess. Studsgaard[d] mentions a man of thirty-five who, for the purpose of stopping diarrhea, introduced into his rectum a preserve-bottle nearly seven inches long with the open end uppermost. The next morning he had violent pain in the abdomen, and the bottle could be felt through the abdominal wall. It was necessary to perform abdominal section through the linea alba, divide the sigmoid flexure, and thus remove the bottle. The intestine was sutured and the patient recovered. The bottle measured 17 cm. long, five cm. in diameter at its lower end, and three cm. at its upper end.

[a] 777, 1860. [b] 548, 1861, ii., 564. [c] 548, 1863, ii., 599. [d] 425, 1878.

Briggs[a] reports a case in which a **wine glass** was introduced into the rectum, and although removed twenty-four hours afterward, death ensued. Hockenhull[b] extracted 402 stones from the rectum of a boy of seven. Landerer[c] speaks of a curious case in which the absorptive power of the rectum was utilized in the murder of a boy of fifteen. In order to come into the possession of a large inheritance the murderess poisoned the boy by introducing the ends of some **phosphorous matches** into his rectum, causing death that night; there was intense inflammation of the rectum. The woman was speedily apprehended, and committed suicide when her crime was known.

Complete transfixion of the abdomen does not always have a fatal issue. In fact, two older writers, Wisemann and Muys, testify that it is quite possible for a person to be transfixed without having any portion of the intestines or viscera wounded. In some nations in olden times, the extremest degree of punishment was transfixion by a stake. In his voyages and travels,[d] in describing the death of the King of Demaa at the hands of his page, Mendez Pinto says that instead of being reserved for torture, as were his successors Ravaillac, and Gerard, the slayer of William the Silent, the assassin was impaled alive with a long stake which was thrust in at his fundament and came out at the nape of his neck. There is a record[e] of a man of twenty-five, a soldier in the Chinese war of 1860, who, in falling from his horse, was accidentally transfixed by a bayonet. The steel entered his back two inches to the left of the last dorsal vertebra, and reappeared two inches to the left and below the umbilicus; as there was no symptom of visceral wound there were apparently no injuries except perforation of the parietes and the peritoneum. The man recovered promptly.

Ross[f] reports a case of transfixion in a young male aborigine, a native of New South Wales, who had received a spear-wound in the epigastrium during a quarrel; extraction was impossible because of the sharp-pointed barbs; the spear was, therefore, sawed off, and was removed posteriorly by means of a small incision. The edges of the wound were cleansed, stitched, and a compress and bandage applied. During the night the patient escaped and joined his comrades in the camp, and on the second day was suffering with radiating pains and distention. The following day it was found that the stitches and plaster had been removed, and the anterior wound was gaping and contained an ichorous discharge. The patient was bathing the wound with a decoction of the leaves of the red-gum tree. Notwithstanding that the spear measured seven inches, and the interference of treatment, the abdominal wound closed on the sixth day, and recovery was uninterrupted. Gilkrist[g] mentions an instance in which a ramrod was fired into a soldier's abdomen, its extremity lodging in the spinal column, without causing the slightest evidence of wounds of the intestines or viscera. A minute postmor-

[a] 579, 1880. [b] 176, 1886–87, iii., 547. [c] 156; and quoted 224, 1882, i., 498.
[d] London, 1663, 264. [e] 548, March 30, 1861. [f] 476, 1891. [g] 476, 1832, ii., 147.

tem examination was held some time afterward, the soldier having died by drowning, but the results were absolutely negative as regards any injury done by the passage of the ramrod.

Humphreys[a] says that a boy of eleven, while "playing soldier" with another boy, accidentally fell on a rick-stake. The stake was slightly curved at its upper part, being 43 inches long and three inches in circumference, and sharp-pointed at its extremity. As much as 17½ inches entered the body of the lad. The stake entered just in front of the right spermatic cord, passed beneath Poupart's ligament into the cavity of the abdomen, traversed the whole cavity across to the left side; it then entered the thorax by perforating the diaphragm, displaced the heart by pushing it to the right of the sternum, and pierced the left lung. It then passed anteriorly under the muscles and integument in the axillary space, along the upper third of the humerus, which was extended beyond the head, the external skin not being ruptured. The stick remained in situ for four hours before attempts at extraction were made. On account of the displacement of the heart it was decided not to give chloroform. The boy was held down by four men, and Humphreys and his assistant made all the traction in their power. After removal not more than a teaspoonful of blood followed. The heart still remained displaced, and a lump of intestine about the size of an orange protruded from the wound and was replaced. The boy made a slow and uninterrupted recovery, and in six weeks was able to sit up. The testicle sloughed, but five months later, when the boy was examined, he was free from pain and able to walk. There was a slight enlargement of the abdomen and a cicatrix of the wound in the right groin. The right testicle was absent, and the apex of the heart was displaced about an inch.

Woodbury[b] reports the case of a girl of fourteen, who fell seven or eight feet directly upon an erect stake in a cart; the tuberosity was first struck, and then the stake passed into the anus, up the rectum for two inches, thence through the rectal wall, and through the body in an obliquely upward direction. Striking the ribs near the left nipple it fractured three, and made its exit. The stake was three inches in circumference, and 27 inches of its length passed into the body, six or seven inches emerging from the chest. This girl recovered so rapidly that she was able to attend school six weeks afterward. In a case reported by Bailey[c] a middle-aged woman, while sliding down a hay-stack, struck directly upon a pitchfork handle which entered the vagina; the whole weight of the woman was successfully maintained by the cellular tissue of the uterovaginal culdesac.

Minot[d] speaks of the passage of one prong of a pitchfork through the body of a man of twenty-one, from the perineum to the umbilicus; the man recovered.

Hamilton[e] reports a case of laceration of the perineum with penetration

[a] 548, 1871, ii., 392. [b] 579, 1874, xiv., 151. [c] Ibid
[d] 218, 1861, 80. [e] Trans. Belmont M. Soc., Bridgeport, Ohio, 1849–50, 55.

of the pelvic cavity to the depth of ten inches by a stick ¾ inch thick. Prowse[a] mentions the history of a case of impalement in a man of thirty-four, who, coming down a hay-stack, alighted on the handle of a pitchfork which struck him in the middle of the scrotum, and passed up between the skin and fascia to the 10th rib. Recovery was prompt.

There are several cases on record in which extensive wounds of the abdominal parietes with protrusion and injury to the intestine have not been followed by death. Injuries to the intestines themselves have already been spoken of, but there are several cases of **evisceration** worthy of record.

Doughty[b] says that at midnight on June 7, 1868, he was called to see a man who had been stabbed in a street altercation with a negro. When first seen in the street, the patient was lying on his back with his abdomen exposed, from which protruded an enormous mass of intestines, which were covered with sand and grit; the small intestine (ileum) was incised at one point and scratched at another by the passing knife. The incision, about an inch in length, was closed with a single stitch of silk thread, and after thorough cleansing the whole mass was returned to the abdominal cavity. In this hernial protrusion were recognized four or five feet of the ileum, the cecum with its appendix, part of the ascending colon with corresponding portions of the mesentery; the distribution of the superior mesentery, made more apparent by its living pulsation, was more beautifully displayed in its succession of arches than in any dissection that Doughty had ever witnessed. Notwithstanding the extent of his injuries the patient recovered, and at last reports was doing finely.

Barnes[c] reports the history of a negro of twenty-five who was admitted to the Freedmen's Hospital, New Orleans, May 15, 1867, suffering from an incised wound of the abdomen, from which protruded eight inches of colon, all of the stomach, and nearly the whole of the small intestines. About 2½ feet of the small intestine, having a whitish color, appeared to be filled with food and had much of the characteristic feeling of a sausage. The rest of the small intestine had a dark-brown color, and the stomach and colon, distended with gas, were leaden-colored. The viscera had been exposed to the atmosphere for over an hour. Having nothing but cold Mississippi water to wash them with, Barnes preferred returning the intestines without any attempt at removing blood and dirt further than wiping with a cambric handkerchief and the stripping they would naturally be subjected to in being returned through the opening. In ten minutes they were returned; they were carefully examined inch by inch for any wound, but none was found. Three silver sutures were passed through the skin, and a firm compress applied. The patient went to sleep shortly after his wound was dressed, and never had a single subsequent bad symptom; he was discharged on May 24th, the wound being entirely healed, with the exception of a cartilage of a rib which had not reunited.

[a] 294, 1884, ii., 20. [b] 847, 93. [c] 847, 95.

Rogers[a] mentions the case of a carpenter of thirty-six who was struck by a missile thrown by a circular saw, making a wound two inches above the umbilicus and to the left. Through the opening a mass of intestines and a portion of the liver, attached by a pedicle, protruded. A portion of the liver was detached, and the liver, as well as the intestines, were replaced, and the man recovered.

Baillie,[b] Bhadoory,[c] Barker, Edmundson,[d] Johnson,[e] and others, record instances of abdominal wounds accompanied by extensive protrusion of the intestines, and recovery. Shah[f] mentions an abdominal wound with protrusion of three feet of small intestine. By treatment with ice, phenol, and opium, recovery was effected without peritonitis.

Among **nonfatal perforating gunshot wounds of the abdomen,** Loring[g] reports the case of a private in the First Artillery who recovered after a double gunshot perforation of the abdomen. One of the balls entered 5½ inches to the left of the umbilicus, and two inches above the crest of the ilium, making its exit two inches above the crest of the ilium, on a line with and two inches from the 4th lumbar vertebra. The other ball entered four inches below and to the rear of the left nipple, making its exit four inches directly below the point of entrance. In their passages these balls did not wound any of the viscera, and with the exception of traumatic fever there was no disturbance of the health of the patient. Schell[h] records the case of a soldier who was wounded July 3, 1867, by a conoid ball from a Remington revolver of the Army pattern. The ball entered on the left side of the abdomen, its lower edge grazing the center of Poupart's ligament, and passing backward, inward, and slightly upward, emerged one inch to the left of the spinous process of the sacrum. On July 6th all the symptoms of peritonitis made their appearance. On July 11th there was free discharge of fecal matter from both anterior and posterior wounds. This discharge continued for three days and then ceased. By August 12th both wounds were entirely healed. Mineer[i] reports a case of a wound from a revolver-ball entering the abdomen, passing through the colon, and extracted just above the right ilium. Under simple treatment the patient recovered and was returned to duty about ten weeks afterward.

There are a number of cases on record in which a **bullet entering the abdominal cavity** is subsequently **voided** either **by the bladder or by the bowel.** Ducachet[j] mentions two cases at the Georgetown Seminary Hospital during the late war in which Minié balls entering the abdominal wall were voided by the anus in a much battered condition. Bartlett[k] reports the case of a young man who was accidentally shot in the abdomen with a Colt's revolver. Immediately after the accident he complained of constant and press-

[a] 269, 1875, 884. [b] 435, 1866, i., 9. [c] 435, 1872, vii., 135.
[d] 312, xxxvi., 209. [e] 536, 1867, iii., 225. [f] 435, ix., 297.
[g] 847, 55. [h] 847, 48. [i] Ibid. [j] 130, 1863, vii., 134. [k] 331, 1856.

ing desire to void his urine. While urinating on the evening of the third day, the ball escaped from the urethra and fell with a click into the chamber. After the discharge of the ball the intolerable symptoms improved, and in two or three weeks there was complete recovery. Hoag mentions a man who was wounded by a round musket-ball weighing 400 grains. It had evidently passed through the lung and diaphragm and entered the alimentary canal; it was voided by the rectum five days after the injury. Lenox [a] mentions the fact of a bullet entering the abdominal wall and subsequently being passed from the rectum. Day and Judkins report similar cases. Rundle [b] speaks of the lodgment of a bullet, and its escape, after a period of seven and one-half years, into the alimentary canal, causing internal strangulation and death.

Wounds of the liver often end very happily, and there are many cases on record in which such injuries have been followed by recovery, even when associated with considerable loss of liver-substance. In the older records, Glandorp [380] and Scultetus mention cures after large wounds of the liver. Fabricius Hildanus reports a case that ended happily, in which a piece of liver was found in the wound, having been separated by a sword-thrust. There is a remarkable example [c] of recovery after multiple visceral wounds, self-inflicted by a lunatic. This man had 18 wounds, 14 having penetrated the abdomen, the liver, colon, and the jejunum being injured; by frequent bleeding, strict regimen, dressing, etc., he recovered his health and senses, but relapsing a year and a half later, he again attempted suicide, which gave the opportunity for a postmortem to learn the extent of the original injuries. Plater,[635] Schenck, Cabrolius,[245] the Ephemerides, and Nolleson [d] mention recovery after wounds of the liver. Salmuth [706] and the Ephemerides report questionable instances in which portions of the liver were ejected in violent vomiting. Macpherson [e] describes a wound of the liver occurring in a Hindoo of sixty who had been struck by a spear. A portion of the liver was protruding, and a piece weighing 1¼ ounces was removed, complete recovery following.

Postempski [f] mentions a case of suture of the liver after a stab-wound. Six sutures of chromicized cat-gut were carefully tightened and fastened with a single loop. The patient left his bed on the sixth day and completely recovered. Gann [g] reports a case of harpoon-wound of the liver. While in a dory spearing fish in the Rio Nuevo, after a sudden lurch of the boat, a young man of twenty-eight fell on the sharp point of a harpoon, which penetrated his abdomen. About one inch of the harpoon was seen protruding from below the tip of the ensiform cartilage; the harpoon was seven inches long. It was found that the instrument had penetrated the right lobe of the liver; on passing the hand backward along the inferior surface of the liver, the point

[a] 250, 1872–73, 112. [b] 548, 1866, i., 306. [c] Mém. de l'Acad. Roy. des Sciences, 1705.
[d] 462, T. xxii., 258. [e] 661, 1846. [f] 684, June 9, 1888. [g] 476, 1894, i., 1371.

could be felt projecting through its posterior border. On account of two sharp barbs on the spear-point, it was necessary to push the harpoon further in to disengage the barbs, after which it was easily removed. Recovery followed, and the patient was discharged in twenty-one days.

Romme[a] discusses the subject of punctured wounds of the liver, as a special text using the case of the late President Carnot. He says that in 543 cases of traumatism of the liver collected by Elder, 65 were caused by cutting or sharp-pointed instruments. Of this group, 23 recovered and 42 died. The chief causes of death were hemorrhage and peritonitis. The principal symptoms of wounds of the liver, such as traumatic shock, collapse, local and radiating pains, nausea, vomiting, and respiratory disturbances were all present in the case of President Carnot. From an experience gained in the case of the President, Romme strongly recommends exploratory celiotomy in all penetrating wounds of the liver. Zeidler[b] reports three cases of wound of the liver in which recovery ensued. The hemorrhage in one case was arrested by the tampon, and in the other by the Pacquelin cautery.

McMillan[c] describes a man of twenty who was kicked by a horse over the liver and rupturing that organ. A large quantity of offensive fluid was drawn off from the liver, and the man recovered. Frazer[d] reports a case of rupture of liver and kidney in a boy of thirteen who was squeezed between the tire and driving chain of a mill, but who recovered despite his serious symptoms. Allen[e] mentions recovery after an extensive incised wound of the abdomen, liver, and lung. Massie[f] cites an instance of gunshot wound of the right hypochondrium, with penetration and protrusion of the liver. The patient, a boy of seven, recovered after excision of a small part of the protruding liver. Lawson Tait has incised the liver to the extent of three inches, evacuated two gallons of hydatids, and obtained successful recovery in ten weeks.

There are several cases of wound of the liver followed by recovery reported by surgeons of the United States Army.[g] Whitehead mentions a man of twenty-two who on June 3, 1867, was shot in the liver by a slug from a pistol. At the time of the injury he bled freely from the wound of entrance, continuing to lose blood and bile until daylight the next morning, when the hemorrhage ceased, but the flow of bile kept on. By June 10th there was considerable improvement, but the wound discharged blood-clots, bile, and serum. When the patient left the hospital on July 15th the wound was healthy, discharging less than 1½ ounces during the twenty-four hours, of a mixture of free bile, and bile mixed with thick material. When last heard from—July 27, 1867—the patient was improving finely in flesh and strength. McKee mentions a commissary-sergeant stationed at Santa Fé,

[a] La Tribune Médicale, July 5, 1894. [b] 300, Sept. 13, 1894. [c] 476, 1860, ii., 431.
[d] 536, 1878, 200. [e] 591, 1855. [f] 593, ix., 146. [g] 847, 49.

New Mexico, who recovered after a gunshot wound of the liver. Hassig reports the case of a private of twenty-six who was wounded in a fray near Paducah, Kentucky, by a conoid ball, which passed through the liver. The ball was cut out the same day. The patient recovered and was returned to duty in May, 1868. Patzki mentioned a private in the Sixth Cavalry, aged twenty-five, who recovered from a gunshot wound of the abdomen, penetrating the right lobe of the liver and the gall-bladder.

Resection of the Liver.—It is remarkable to what extent portions of the liver may be resected by the knife, cautery, or ligature, and the patient recover. Langenbuch records a case in which he successfully removed the greater portion of the left lobe of a woman of thirty. The lobe had been extensively deformed by tight lacing, and caused serious inconvenience. There was considerable hemorrhage, but the vessels were secured, and the woman made a good recovery.[845] McWhinnie, in The Lancet, records a case of dislodgment of an enlarged liver from tight lacing. Terrilon[a] mentions an instance in which a portion of the liver was removed by ligature after celiotomy. The ligature was removed in seven days, and the sphacelated portion of the liver came off with it. A cicatrix was completed at the end of six weeks, and the patient, a woman of fifty-three, made an excellent recovery. Bastianelli[b] discusses those cases in which portions of the liver, having been constricted from the general body of the organ and remaining attached by a pedicle, give rise to movable tumors of the abdomen. He records such a case in a woman of thirty-seven who had five children. A piece of liver weighing 500 grams was removed, and with it the gall-bladder, and the patient made an uninterrupted recovery. Tricomi reports a case in which it was found necessary to remove the left lobe of the liver. An attempt had been made to remove a liver-tumor the size of a fist by constricting the base with an elastic ligature. This attempt was a failure, and cure was also un-

Fig. 222.—Floating liver (Keen and White).

[a] Quoted 536, 1890, ii., 263.

[b] 843, 236.

successfully attempted by wire ligature and the thermocautery. The growth was cut away, bleeding was arrested by the thermocautery and by iron-solution, the wound entirely healed, and the patient recovered. Valerian von Meister has proved that the liver has marvelous powers of regeneration, and that in rabbits, cats, and dogs, even three-fourths of the organ may be reproduced in from forty-five to sixty-five days. This regeneration is brought about chiefly by hypertrophy of the lobules.[a]

Floating liver is a rare malady in which the liver forms an abdominal prominence that may be moved about, and which changes its situation as the patient shifts the attitude. The condition usually arises from a lax abdominal wall following repeated pregnancies. The accompanying illustration (Fig. 222) exhibits a typical case verified by postmortem examination.[845]

Hypertrophy of the Liver.—The average weight of the normal liver is from 50 to 55 ounces, but as noted by Powell,[642] it may become so hypertrophic as to weigh as much as 40 pounds. Bonet describes a liver weighing 18 pounds; and in his "Medical and Surgical Observations," Gooch speaks of a liver weighing 28 pounds. Vieussens, the celebrated anatomist,[b] reports an instance in which the liver weighed 20 pounds, and in his "Aphorisms," Vetter cites a similar instance. In 1811 Kraus of Germany describes a liver weighing 25 pounds; modern instances of enlarged liver are too numerous to be quoted here.

Rupture of the gall-bladder, although generally followed by death, is not always fatal. In such cases bile is usually found in the abdominal cavity. Fergus[c] mentions a case in which, after this accident, the patient was considered convalescent and was walking about, when, on the seventh day, peritonitis suddenly developed and proved fatal in two days. Several cases of this accident have been reported as treated successfully by incision and drainage (Lane) or by inspiration (Bell). In these cases large quantities of bile escaped into the abdominal cavity. Peritonitis does not necessarily follow.[845] **Cholecystotomy** for the relief of the distention of the gall-bladder from obstruction of the common or cystic duct and for the removal of gall-stones was first performed in 1867 by Bobbs of Indianapolis, but it is to Marion Sims, in 1878, that perfection of the operation is due. It has been gradually improved and developed, until to-day it is a most successful operation. Tait reports 54 cases with 52 perfect recoveries. **Cholycystectomy,** or excision of the gall-bladder, was first practised in 1880 by Langenbuch of Berlin, and is used in cases in which gall-stones are repeatedly forming. Ashhurst's statistics show only four deaths in 28 cases.

At St. Bartholomew's Hospital, in London, is a preserved specimen of a gall-bladder which had formed the contents of a hernial sac, and which, near the fundus, shows a constriction caused by the femoral ring. It was

[a] 843, 237. [b] "Traite des Mal. Internes," T. ii. [c] 174, 400.

taken from a woman of forty-five who was admitted into the hospital with a strangulated femoral hernia. The sac was opened and its contents were returned. The woman died in a few days from peritonitis. The gall-bladder was found close to the femoral ring, and showed a marked constriction. The liver was misshapen from tight lacing, elongated and drawn downward toward the ring. There was no evidence that any portion of intestine or other structure besides the gall-bladder had passed through the ring.[619]

The fatality of **rupture of the spleen** is quite high. Out of 83 cases of injury to this organ collected by Elder, and quoted by MacCormac, only 11 recovered; but the mortality is less in **punctured or incised wounds** of this organ, the same authorities mentioning 29 recoveries out of 35 cases. In his "Surgery" Gooch says that at the battle of Dettingen one of Sir Robert Rich's Dragoons was left all night on the field, weltering in his blood, his spleen hanging out of his body in a gangrenous state. The next morning he was carried to the surgeons who ligated the large vessels, and extirpated the spleen; the man recovered and was soon able to do duty. In the Philosophical Transactions[a] there is a report of a man who was wounded in the spleen by a large hunting-knife. Fergusson found the spleen hanging from the wound and ligated it. It separated in ten days and the patient recovered.

Williams[b] reports a stab-wound of the spleen in a negro of twenty-one. The spleen protruded, and the protruding part was ligated by a silver wire, one-half of the organ sloughing off; the patient recovered. Sir Astley Cooper mentions a curious case, in which, after vomiting, during which the spleen was torn from its attachments, this organ produced a swelling in the groin which was supposed to be a hernia. The vomiting continued, and at the end of a week the woman died; it was then found that the spleen had been turned half round on its axis, and detached from the diaphragm; it had become enlarged; the twist interrupted the return of the blood. Portal[c] speaks of a rupture of the spleen simply from engorgement. There was no history of a fall, contusion, or other injury. Tait[d] describes a case of rupture of the spleen in a woman who, in attempting to avoid her husband's kick, fell on the edge of the table. There were no signs of external violence, but she died the third day afterward. The abdomen was found full of blood, and the spleen and peritoneal covering was ruptured for three inches.

Splenectomy, excision of the spleen, has been performed a number of times, with varying results, but is more successful when performed for injury than when for disease. Ashhurst[174] has tabulated a total of 109 operations, 27 having been for traumatic causes, and all but five having terminated successfully; of 82 operations for disease, only 32 recovered. Vulpius has collected 117 cases of splenectomy, with a death-rate of 50 per cent. If, how-

[a] 629, 1738. [b] 230, xii., 86. [c] 39, T. v., 345. [d] 605, 1844, i., 104.

ever, from these cases we deduct those suffering with leukocythemia and lardaceous spleen, in which the operation should not be performed, the mortality in the remaining 85 cases is reduced to 33 per cent. Terrier speaks of splenectomy for torsion or twisting of the pedicle, and such is mentioned by Sir Astley Cooper, who has found records of only four such cases. Conklin[a] reports a successful case of splenectomy for malarial spleen, and in reviewing the subject he says that the records of the past decade in operations for simple hypertrophy, including malaria, show 20 recoveries and eight deaths. He also adds that extirpation in cases of floating or displaced spleen was attended with brilliant results. Zuccarelli[b] is accredited with reporting two cases of splenectomy for malarial spleen, both of which recovered early. He gives a table of splenectomies performed in Italy, in which there were nine cases of movable spleen, with two deaths; eight cases of simple hypertrophy, with three deaths; 12 cases of malarial spleen, with three deaths; four cases of leukemia and pseudoleukemia, with two deaths. In his experiments on rabbits it was proved by Tizzoni, and in his experiments on dogs, by Credé, that an individual could live without a spleen; but these observations were only confirmatory of what had long been known, for, in 1867, Péan successfully removed a spleen from a woman of twenty. Tricomi[c] reports eight cases in which he had extirpated the spleen for various morbid conditions, with a fortunate issue in all but one. In one case he ligated the splenic artery. In The Lancet[d] there is an account of three recent excisions of the spleen for injury at St. Thomas Hospital in London, and it is added that they are among the first of this kind in Great Britain.

Abnormalities of Size of the Spleen.—The spleen may be extremely small. Storck[e] mentions a spleen that barely weighed an ounce; Schenck speaks of one in the last century that weighed as much as 20 pounds. Frank[351] describes a spleen that weighed 16 pounds; there is another record of one weighing 15 pounds.[f] Elliot[g] mentions a spleen weighing 11 pounds; Burrows[h] one, 11 pounds; Blasius, four pounds; Osiander, nine pounds; Blanchard,[213] 3½ pounds; Richardson,[i] 3½ pounds; and Hare,[j] 93 ounces.

The thoracic duct, although so much protected by its anatomical position, under exceptional circumstances has been **ruptured or wounded.** Kirchner[k] has collected 17 cases of this nature, two of which were due to contusions of the chest, one each to a puncture, a cut, and a shot-wound, and three to erosion from suppuration. In the remaining cases the account fails to assign a definite cause. Chylothorax, or chylous ascites, is generally a result of this injury. Krabbel mentions a patient who was run over by an empty coal car, and who died on the fifth day from suffocation due to an effusion into the right pleural cavity. On postmortem examination it was found

[a] 538, July 28, 1894. [b] 843, 252. [c] Ibid.
[d] Quoted Amer. Med. Review, Dec., 1895. [e] 752, i., 114. [f] 282, 1732, 260.
[g] 524, vii., 46. [h] 528, vii. [i] 548, 1852, ii., 399. [j] 548, 1861, i., 289. [k] 845, 454.

that the effusion was chyle, the thoracic duct being torn just opposite the 9th dorsal vertebra, which had been transversely fractured. In one of Kirchner's cases a girl of nine had been violently pushed against a window-sill, striking the front of her chest in front of the 3d rib. She suffered from pleural effusion, which, on aspiration, proved to be chyle. She ultimately recovered her health. In 1891 Eyer reported a case of rupture of the thoracic duct, causing death on the thirty-eighth day. The young man had been caught between a railroad car and an engine, and no bones were broken.

Manley[a] reports a case of rupture of the thoracic duct in a man of thirty-five, who was struck by the pole of a brewery wagon; he was knocked down on his back, the wheel passing squarely over his abdomen. There was subsequent bulging low down in the right iliac fossa, caused by the presence of a fluid, which chemic and microscopic examination proved was chyle. From five to eight ounces a day of this fluid were discharged, until the tenth day, when the bulging was opened and drained. On the fifteenth day the wound was healed and the man left the hospital quite restored to health.

Keen has reported four instances of accidental injury to the thoracic duct, near its termination at the base of the left side of the neck; the wounding was in the course of removals for deep-seated growths in this region. Three of the cases recovered, having sustained no detriment from the injury to the thoracic duct. One died; but the fatal influence was not specially connected with the wound of the duct.

Possibly the boldest operation in the history of surgery is that for **ligation of the abdominal aorta** for inguinal aneurysm. It was first practised by Sir Astley Cooper in 1817, and has since been performed several times with a uniformly fatal result, although Monteiro's patient survived until the tenth day, and there is a record in which ligature of the abdominal aorta did not cause death until the eleventh day.[b] Loreta of Bologna is accredited with operating on December 18, 1885, for the relief of a sailor who was suffering from an abdominal aneurysm caused by a blow. An incision was made from the ensiform cartilage to the umbilicus, the aneurysm exposed, and its cavity filled up with two meters of silver-plated wire. Twenty days after no evidence of pulsation remained in the sac, and three months later the sailor was well and able to resume his duties.

Ligation of the common iliac artery, which, in a case of gunshot injury, was first practised by Gibson of Philadelphia in 1812, is, happily, not always fatal. Of 82 cases collected by Ashhurst, 23 terminated successfully.

Foreign bodies loose in the abdominal cavity are sometimes voided at stool, or may suppurate externally. Fabricius Hildanus[334] gives us a history of a person wounded with a sword-thrust into the abdomen, the point break-

[a] 533, lxv., 1894, 491.

[b] 810, 1853.

ing off. The sword remained one year in the belly and was voided at stool. Erichsen[a] mentions an instance in which a cedar lead-pencil stayed for eight months in the abdominal cavity. Desgranges[b] gives a case of a fish-spine in the abdominal cavity, and ten years afterward it ulcerated through an abscess in the abdominal wall. Keetley[c] speaks of a man who was shot when a boy; at the time of the accident the boy had a small spelling-book in his pocket. It was not until adult life that from an abscess of the groin was expelled what remained of the spelling-book that had been driven into the abdomen during boyhood. Kyle[d] speaks of the removal of a corn-straw 33 inches in length by an incision ten inches long, at a point about equidistant from the umbilicus to the anterior spinous process of the right ilium.

There are several instances on record of tolerance of **foreign bodies in the skin and muscles of the back** for an extended period. Gay[e] speaks of a curious case in which the point of a sheath-knife remained in the back of an individual for nine years. Bush reported to Sir Astley Cooper[f] the history of a man who, as he supposed, received a wound in the back by canister shot while serving on a Tartar privateer in 1779. There was no ship-surgeon on board, and in about a month the wound healed without surgical assistance. The man suffered little inconvenience and performed his duties as a seaman, and was impressed into the Royal Navy. In August, 1810, he complained of pain in the lumbar region. He was submitted to an examination, and a cicatrix of this region was noticed, and an extraneous body about ½ inch under the integument was felt. An incision was made down it, and a rusty blade of a seaman's clasp-knife extracted from near the 3d lumbar vertebra. The man had carried this knife for thirty years. The wound healed in a few days and there was no more inconvenience.

Fracture of the lower part of the spine is not always fatal, and notwithstanding the lay-idea that a broken back means certain death, patients with well-authenticated cases of vertebral fracture have recovered. Warren[g] records the case of a woman of sixty who, while carrying a clothes-basket, made a misstep and fell 14 feet, the basket of wet clothes striking the right shoulder, chest, and neck. There was fracture of the 4th dorsal vertebra at the transverse processes. By seizing the spinous process it could be bent backward and forward, with the peculiar crepitus of fractured bone. The clavicle was fractured two inches from the acromial end, and the sternal end was driven high up into the muscles of the neck. The arm and hand were paralyzed, and the woman suffered great dyspnea. There was at first a grave emphysematous condition due to the laceration of several broken ribs. There was also suffusion and ecchymosis about the neck and shoulder. Although complicated with tertiary syphilis, the woman made a fair recovery,

[a] 550, 1855, 15. [b] 463, iii., 343. [c] 536, 1884, ii., 419.
[d] Western Lancet, Cincinnati, 1848. [e] 218, 1850. [f] 550, 1817. [g] 520, 1882.

and eight weeks later she walked into a doctor's office. Many similar and equally wonderful injuries to the spine are on record.

The results sometimes following the operation of **laminectomy** for fracture of the vertebræ are often marvelous. One of the most successful on record is that reported by Dundore.[a] The patient was a single man who lived in Mahanoy, Pa., and was admitted to the State Hospital for Injured Persons, Ashland, Pa., June 17, 1889, suffering from a partial dislocation of the 9th dorsal vertebra. The report is as follows :—"He had been a laborer in the mines, and while working was injured March 18, 1889, by a fall of top rock, and from this date to that of his admission had been under the care of a local physician without any sign of improvement. At the time of his admission he weighed but 98 pounds, his weight previous to the injury being 145. He exhibited entire loss of motion in the lower extremities, with the exception of very slight movement in the toes of the left foot; sensation was almost *nil* up to the hips, above which it was normal; he had complete retention of urine, with a severe cystitis. His tongue was heavily coated, the bowels constipated, and there was marked anorexia, with considerable anemia. His temperature varied from 99° to 100° in the morning, and from 101° to 103° in the evening. The time which had elapsed since the accident precluded any attempt at reduction, and his anemic condition would not warrant a more radical method.

"He was put on light, nourishing diet, iron and strychnin were given internally, and electricity was applied to the lower extremities every other day; the cystitis was treated by irrigating the bladder each day with Thiersch's solution. By August his appetite and general condition were much improved, and his weight had increased to 125 pounds, his temperature being 99° or less each morning, and seldom as high as 100° at night. The cystitis had entirely disappeared, and he was able, with some effort, to pass his urine without the aid of a catheter. Sensation in both extremities had slightly improved, and he was able to slightly move the toes of the right foot. This being his condition, an operation was proposed as the only means of further and permanent improvement, and to this he eagerly consented, and, accordingly, on the 25th of August, the 9th dorsal vertebra was trephined.

"The cord was found to be compressed and greatly congested, but there was no evidence of laceration. The laminæ and spinous processes of the 8th and 9th dorsal vertebræ were cut away, thus relieving all pressure on the cord; the wound was drained and sutured, and a plaster-of-Paris jacket applied, a hole being cut out over the wound for the purpose of changing the dressing when necessary. By September 1st union was perfect, and for the next month the patient remained in excellent condition, but without any sign of improvement as to sensation and motion. Early in October he was able

[a] 533, Nov. 24, 1894.

to slightly move both legs, and had full control of urination; from this time on his paralysis rapidly improved; the battery was applied daily, with massage morning and evening; and in November the plaster-of-Paris jacket was removed, and he propelled himself about the ward in a rolling chair, and shortly after was able to get about slowly on crutches. He was discharged December 23d, and when I saw him six months later he walked very well and without effort; he carried a cane, but this seemed more from habit than from necessity. At present date he weighs 150 pounds, and drives a huckster wagon for a living, showing very little loss of motion in his lower extremities."

Although few cases show such wonderful improvement as this one, statistics prove that the results of this operation are sometimes most advantageous. Thorburn[a] collects statistics of 50 operations from 1814 to 1885, undertaken for relief of injuries of the spinal cord. Lloyd[b] has compiled what is possibly the most extensive collection of cases of spinal surgery, his cases including operations for both disease and injury. White has collected 37 cases of recent date; and Chipault[c] reports two cases, and collected 33 cases. Quite a tribute to the modern treatment by antisepsis is shown in the results of laminectomy. Of his non-antiseptic cases Lloyd reports a mortality of 65 per cent.; those surviving the operation are distributed as follows: Cured, one; partially cured, seven; unknown, two; no improvement, five. Of those cases operated upon under modern antiseptic principles, the mortality was 50 per cent.; those surviving were distributed as follows: Cured, four; partially cured, 15; no improvement, 11. The mortality in White's cases, which were all done under antiseptic precautions, was 38 per cent. Of those surviving, there were six complete recoveries, six with benefit, and 11 without marked benefit. Pyle[d] collects 52 cases of spinal disease and injury, in which laminectomy was performed. All the cases were operated upon since 1890. Of the 52 cases there were 15 deaths (a mortality of 29.4 per cent.), 26 recoveries with benefit, and five recoveries in which the ultimate result has not been observed. It must be mentioned that several of the fatal cases reported were those of cervical fracture, which is by far the most fatal variety.

Injury to the spinal cord does not necessarily cause immediate death. Mills and O'Hara, both of Philadelphia, have recorded instances of recovery after penetrating wound of the spinal marrow.[e] Eve[f] reports three cases of gunshot wound in which the balls lodged in the vertebral canal, two of the patients recovering. He adds some remarks on the division of the spinal cord without immediate death.

Ford[g] mentions a gunshot wound of the spinal cord, the patient living ten days; after death the ball was found in the ascending aorta. Henley[h] speaks of a mulatto of twenty-four who was stabbed in the back with a knife. The

[a] 224, No. 1747, 1894. [b] 124, July, 1891. [c] 162, 1890, ii., 673. [d] 150, June, 1894.
[e] 547, 1879, ix., 265. [f] 124, lvi., 103. [g] 744, 1866, i., 286. [h] 538, 1874, ix., 423.

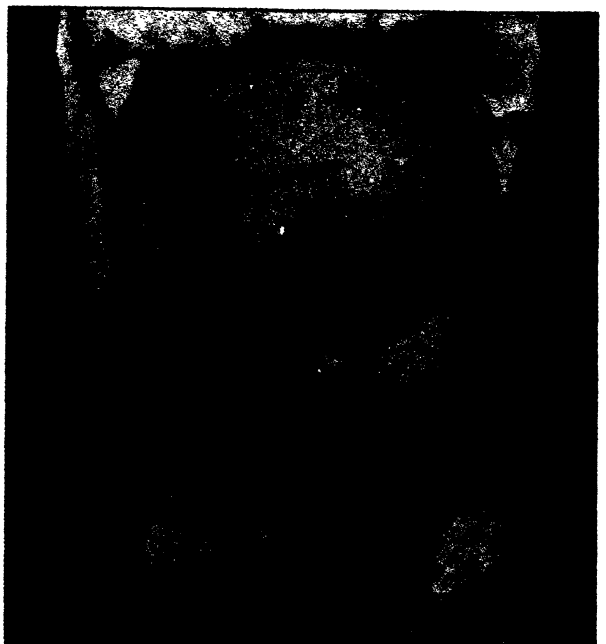
blade entered the body of the 6th dorsal vertebra, and was so firmly embedded that the patient could be raised entirely clear of the bed by the knife alone. An ultimate recovery ensued.

Although the word **hernia** can be construed to mean the protrusion of any viscus from its natural cavity through normal or artificial openings in the surrounding structures, the usual meaning of the word is protrusion of the abdominal contents through the parietes—what is commonly spoken of as rupture. Hernia may be congenital or acquired, or may be single or multiple —as many as five having been seen in one individual.[a] More than two-thirds of cases of rupture suffer from inguinal hernia. In the oblique form of inguinal hernia the abdominal contents descend along the inguinal canal to the outer side of the epigastric artery, and enter the scrotum in the male, and the labium majus in the female. In this form of hernia the size of the sac is sometimes enormous, the accompanying illustration showing extreme cases of both scrotal and labial hernia[845] (Plate 7). Umbilical hernia may be classed under three heads: congenital, infantile, and adult. Congenital umbilical hernia occurs most frequently in children, and is brought about by the failure of the abdominal walls to close. When of large size it may contain not only the intestines, but various other organs, such as the spleen, liver, etc. (Fig. 223). In some monsters all the abdominal contents are contained in the hernia. Infantile umbilical hernia is common, and appears after the separation of the umbilical cord; it is caused by the yielding of the cicatrix in this situation. It never reaches a large size, and shows a tendency to spontaneous cure. Adult umbilical hernia rarely commences in infancy. It is most commonly seen in persons with pendulous bellies, and is sometimes of enormous size, in addition to the ordinary abdominal contents, containing even the stomach and uterus. A few years since there was a man in Philadelphia past middle age, the victim of adult umbilical hernia so pendulous that while walking he had to support it with his arms and hands. It was said that this hernia did not enlarge until after his service as a soldier in the late war.

Fig. 223.—Congenital umbilical hernia. A, liver; C, intestine; D, cord; E, pedicle.

[a] 224, 1874, i., 805.

PLATE 7.



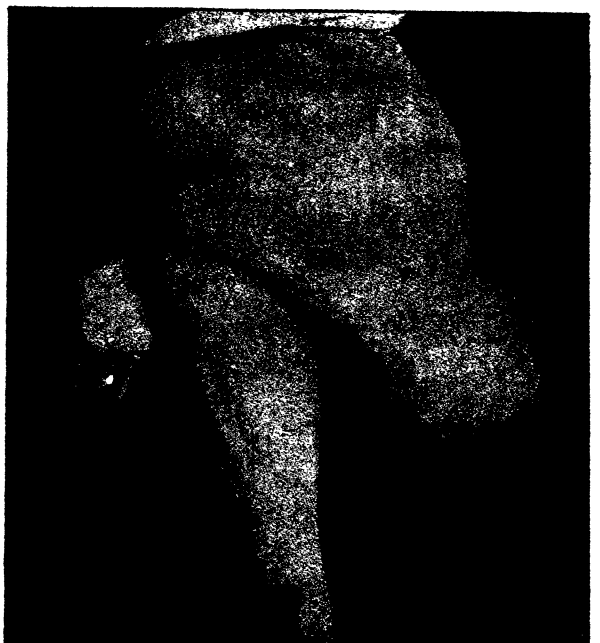


Fig. 1.—Large scrotal hernia. Fig. 2.—Large labial hernia (Keen and White).

Abbott[a] recites the case of an Irish woman of thirty-five who applied to know if she was pregnant. No history of a hernia could be elicited. No pregnancy existed, but there was found a ventral hernia of the abdominal viscera through an opening which extended the entire length of the linea alba, and which was four inches wide in the middle of the abdomen.

Pim[b] saw a colored woman of twenty-four who, on December 29, 1858, was delivered normally of her first child, and who died in bed at 3 A. M. on February 12, 1859. The postmortem showed a tumor from the ensiform cartilage to the symphysis pubis, which contained the omentum, liver (left lobe), small intestines, and colon. It rested upon the abdominal muscles of the right side. The pelvic viscera were normally placed and there was no inguinal nor femoral hernia.

Hulke[c] reports a case remarkable for the immense size of the rupture which protruded from a spot weakened by a former abscess. There was a partial absence of the peritoneal sac, and the obstruction readily yielded to a clyster and laxative. The rupture had a transverse diameter of 14½ inches, with a vertical diameter of 11½ inches. The opening was in the abdominal walls outside of the internal inguinal ring. The writhings of the intestines were very conspicuous through the walls of the pouch.

Fig. 224.—Prodigious umbilical hernia (Dade).

Dade[d] reports a case of prodigious umbilical hernia (Fig. 224). The patient was a widow of fifty-eight, a native of Ireland. Her family history was good, and she had never borne any children. The present dimensions of the tumor, which for fifteen years had been accompanied with pain, and had progressively increased in size, are as follows: Circumference at the base, 19½ inches; circumference at the extremity, 11¼ inches; distance of extremity from abdominal wall, 12¾ inches. Inspection showed a large lobulated tumor protruding from the abdominal wall at the umbilicus. The veins covering it were prominent and distended. The circulation of the skin was defective, giving it a blue appearance. Vermicular contractions of the small intestines could be seen at the distance of ten feet. The tumor was soft and velvety to the touch, and could only partially be reduced. Borborygmus could be easily heard. On percussion the note over the bulk was tympanitic, and dull at the base. The distal extremity contained a portion of the small intestine instead of the

[a] 218, lxv., 161.
[b] 703, xvii., 224.
[c] 476, 1878, 693.
[d] Louisville Med. Monthly, Feb., 1895.

colon, which Wood considered the most frequent occupant. The umbilicus was completely obliterated. Dade believed that this hernia was caused by the weakening of the abdominal walls from a blow, and considered that the protrusion came from an aperture near the umbilicus and not through it, in this manner differing from congenital umbilical hernia.

A peculiar form of hernia is **spontaneous rupture of the abdominal walls,** which, however, is very rare. There is an account of such a case[a] in a woman of seventy-two living in Pittsburg, who, after a spasmodic cough, had a spontaneous rupture of the parietes. The rent was four inches in length and extended along the linea alba, and through it protruded a mass of omentum about the size of a child's head. It was successfully treated and the woman recovered. Wallace[b] reports a case of spontaneous rupture of the abdominal wall, following a fit of coughing. The skin was torn and a large coil of ileum protruded, uncovered by peritoneum. After protracted exposure of the bowel it was replaced, the rent was closed, and the patient recovered.

[a] 545, 1862, vii., 53.

[b] 436, 1881, 340.

CHAPTER XIII.

SURGICAL ANOMALIES OF THE GENITO-URINARY SYSTEM.

Wounds of the kidney may be very severe without causing death, and even one entire kidney may be lost without interfering with the functions of life. Marvand,[a] the Surgeon-Major of an Algerian regiment, reports the case of a young Arab woman who had been severely injured in the right lumbar region by a weapon called a "yataghan," an instrument which has only one cutting edge. On withdrawing this instrument the right kidney was extruded, became strangulated between the lips of the wound, and caused considerable hemorrhage. A ligature was put around the base of the organ, and after some weeks the mass separated. The patient continued in good health the whole time, and her urinary secretion was normal. She was discharged in two months completely recovered. Price[b] mentions the case of a groom who was kicked over the kidney by a horse, and eighteen months later died of dropsy. Postmortem examination showed traces of a line of rupture through the substance of the gland; the preparation was deposited in St. George's Hospital Museum in London. The case is singular in that this man, with granular degeneration of the kidney, recovered from so extensive a lesion, and, moreover, that he remained in perfect health for over a year with his kidney in a state of destructive disease. Borthwick[c] mentions a dragoon of thirty who was stabbed by a sword-thrust on the left side under the short rib, the sword penetrating the pelvis and wounding the kidney. There was no hemorrhage from the external wound, nor pain in the spermatic cord or testicle. Under expectant treatment the man recovered. Castellanos[d] mentions a case of recovery from punctured wound of the kidney by a knife that penetrated the tubular and cortical substance, and entered the pelvis of the organ. The case was peculiar in the absence of two symptoms, viz., the escape of urine from the wound, and retraction of the corresponding testicle. Dusenbury[e] reports the case of a corporal in the army who was wounded on April 6, 1865, the bullet entering both the liver and kidney. Though there was injury to both these important organs, there was no impairment of the patient's health, and he recovered.

[a] Revue de Méd. de Militaire, Oct., 1875.
[b] 779, Feb., 1860, 140.
[c] 149, 1799, 466.
[d] 809, 1874, 281.
[e] 124, Oct., 1865, 399.

Bryant[a] reports four cases of wound of the kidney, with recovery. All of these cases were probably extraperitoneal lacerations or ruptures. Cock[b] found a curious anomaly in a necropsy on the body of a boy of eighteen, who had died after a fall from some height. There was a compound, transverse rupture of the left kidney, which was twice as large as usual, the ureter also being of abnormal size. Further search showed that the right kidney was rudimentary, and had no vein or artery.

Ward[c] mentions a case of ruptured kidney, caused by a fall of seven feet, the man recovering after appropriate treatment. Vernon[d] reports a case of serious injury to the kidney, resulting in recovery in nine weeks. The patient fell 40 feet, landing on some rubbish and old iron, and received a wound measuring six inches over the right iliac crest, through which the lower end of the right kidney protruded; a piece of the kidney was lost. The case was remarkable because of the slight amount of hemorrhage.

Nephrorrhaphy is an operation in which a movable or floating kidney is fixed by suture through its capsule, including a portion of kidney-substance, and then through the adjacent lumbar fascia and muscles. The ultimate results of this operation have been most successful.

Nephrolithotomy is an operation for the removal of stone from the kidney. The operation may be a very difficult one, owing to the adhesions and thickening of all the perinephric tissues, or to the small size or remote location of the stone.

There was a recent exhibition in London,[619] in which were shown the **results of** a number of **recent operations on the kidney.** There was one-half of a kidney that had been removed on account of a rapidly-growing sarcoma from a young man of nineteen, who had known of the tumor for six months; there was a good recovery, and the man was quite well in eighteen months afterward. Another specimen was a right kidney removed at St. Bartholomew's Hospital. It was much dilated, and only a small amount of the kidney-substance remained. A calculus blocked the ureter at its commencement. The patient was a woman of thirty-one, and made a good recovery. From the Middlesex Hospital was a kidney containing a uric acid calculus which was successfully removed from a man of thirty-five. From the Cancer Hospital at Brompton there were two kidneys which had been removed from a man and a woman respectively, both of whom made a good recovery. From the King's College Hospital there was a kidney with its pelvis enlarged and occupied by a large calculus, and containing little secreting substance, which was removed from a man of forty-nine, who recovered. These are only a few of the examples of this most interesting collection. Large calculi of the kidney are mentioned in Chapter XV.

Rupture of the ureter is a very rare injury. Poland[e] has collected

[a] 392, vii., 1861, 41. [b] 779, 1847, i., 293. [c] 224, 1871, ii., 292.
[d] St. Bart. Hosp. Reports, London, 1866, ii., 124. [e] 174, 400.

the histories of four cases, one of which ended in recovery after the evacuation by puncture, at intervals, of about two gallons of fluid resembling urine. The other cases terminated in death during the first, fourth, and tenth weeks respectively. Peritonitis was apparently not present in any of the cases, the urinary extravasation having occurred into the cellular tissue behind the peritoneum.

There are a few recorded cases of uncomplicated **wounds of the ureters.** The only well authenticated case in which the ureter alone was divided is the historic injury of the Archbishop of Paris,[a] who was wounded during the Revolution of 1848, by a ball entering the upper part of the lumbar region close to the spine. Unsuccessful attempts were made to extract the ball, and as there was no urine in the bladder, but a quantity escaping from the wound, a diagnosis of divided ureter was made. The Archbishop died in eighteen hours, and the autopsy showed that the ball had fractured the transverse process of the 3d lumbar vertebra, and divided the cauda equina just below its origin; it had then changed direction and passed up toward the left kidney, dividing the ureter near the pelvis, and finally lodged in the psoas muscle.

It occasionally happens that the ureter is wounded in the removal of uterine, ovarian, or other abdominal tumors. In such event, if it is impossible to transplant to the bladder, the divided or torn end should be brought to the surface of the loin or vagina, and sutured there. In cases of malignant growth, the ureter has been purposely divided and transplanted into the bladder. Penrose,[b] assisted by Baldy, has performed this operation after excision of an inch of the left ureter for carcinomatous involvement. The distal end of the ureter was ligated, and the proximal end implanted in the bladder according to Van Hook's method, which consists in tying the lowered end of the ureter, then making a slit into it, and invaginating the upper end into the lower through this slit. A perfect cure followed. Similar cases have been reported by Kelly, Krug, and Bache Emmet.[c] Reed[d] reports a most interesting series in which he has successfully **transplanted ureters into the rectum.**

Ureterovaginal fistulæ following total extirpation of the uterus, opening of pelvic abscesses, or ulcerations from foreign bodies, are repaired by an operation termed by Bazy of Paris **ureterocystoneostomy,** and suggested by him as a substitute for nephrectomy in those cases in which the renal organs are unaffected. In the repair of such a case after a vaginal hysterectomy Mayo[e] reports a successful reimplantation of the ureter into the bladder.

Stricture of the ureter is also a very rare occurrence except as a result of compression of abdominal or pelvic new growths. Watson[f] has, however, reported two cases of stricture, in both of which a ureter was nearly or quite

[a] 363, 1848. [b] Kansas City Medical Index, No. 5, 1894. [c] 843, 446.
[d] 150, 1892. [e] 538, Feb. 10, 1894. [f] 845, 825.

obliterated by a dense mass of connective tissue. In one case there was a history of the passage of a renal calculus years previously. In both instances the condition was associated with pyonephrosis. Watson has collected the reports of four other cases from medical literature.

A remarkable procedure recently developed by gynecologists, particularly by Kelly of Baltimore, is catheterization and sounding of the ureters. McClellan [a] records a case of penetration of the ureter by the careless use of a catheter.

Injuries of the Bladder.—Rupture of the bladder may result from violence without any external wound (such as a fall or kick) applied to the abdomen. Jones [b] reports a fatal case of rupture of the bladder by a horse falling on its rider. In this case there was but little extravasation of urine, as the vesical aperture was closed by omentum and bowel. Assmuth reports two cases of rupture of the bladder from muscular action. Morris [c] cites the history of a case in which the bladder was twice ruptured: the first time by an injury, and the second time by the giving way of the cicatrix. The patient was a man of thirty-six who received a blow in the abdomen during a fight in a public house on June 6, 1879. At the hospital his condition was diagnosed and treated expectantly, but he recovered perfectly and left the hospital July 10, 1879. He was readmitted on August 4, 1886, over seven years later, with symptoms of rupture of the bladder, and died on the 6th. The postmortem showed a cicatrix of the bladder which had given way and caused the patient's death.

Rupture of the bladder is only likely to happen when the organ is distended, as when empty it sinks behind the pubic arch and is thus protected from external injury. The rupture usually occurs on the posterior wall, involving the peritoneal coat and allowing extravasation of urine into the peritoneal cavity, a condition that is almost inevitably fatal unless an operation is performed. Bartels collected the data of 98 such cases, only four recovering. When the rent is confined to the anterior wall of the bladder the urine escapes into the pelvic tissues, and the prognosis is much more favorable. Bartels collected 54 such cases, 12 terminating favorably. When celiotomy is performed for ruptured bladder, in a manner suggested by the elder Gross, the mortality is much less. Ashhurst collected the reports of 28 cases thus treated, ten of which recovered—a mortality of 64.2 per cent. Ashhurst remarks that he has seen an extraperitoneal rupture of the anterior wall of the bladder caused by improper use of instruments, in the case of retention of urine due to the presence of a tight urethral stricture.

There are a few cases on record in which the bladder has been ruptured by distention from the accumulation of urine, but the accident is a rare one, the urethra generally giving way first. Coats [d] reports two cases of uncomplicated rupture of the bladder. In neither case was a history of injury ob-

[a] 526, 1850, 692. [b] 476, 1870, ii., 252. [c] 476, 1887, i., 418. [d] 224, July 21, 1894.

tainable. The first patient was a maniac; the second had been intoxicated previous to his admission to the hospital, with symptoms of acute peritonitis. The diagnosis was not made. The first patient died in five days and the second in two days after the onset of the illness. At the autopsies the rent was found to be in both instances in the posterior wall of the bladder a short distance from the fundus; the peritoneum was not inflamed, and there was absolutely no inflammatory reaction in the vesical wound. From the statistics of Ferraton and Rivington it seems that **rupture of the bladder is more common in intoxicated persons** than in others—a fact that is probably explained by a tendency to over-distention of the bladder which alcoholic liquors bring about. The liquor imbibed increases the amount of urine, and the state of blunted consciousness makes the call to empty the bladder less appreciated. The intoxicated person is also liable to falls, and is not so likely to protect himself in falling as a sober person.[a]

Gunshot Wounds of the Bladder.—Jackson[b] relates the remarkable recovery of a private in the 17th Tennessee Regiment who was shot in the pelvis at the battle of Mill Springs or Fishing Creek, Ky. He was left supposedly mortally wounded on the field, but was eventually picked up, and before receiving any treatment hauled 164 miles, over mountainous roads in the midst of winter and in a wagon without springs. His urine and excretions passed out through the wounds for several weeks and several pieces of bone came away. The two openings eventually healed, but for twenty-two months he passed pieces of bone by the natural channels.

Eve[c] records the case of a private in the Fifth Tennessee Cavalry who was shot in the right gluteal region, the bullet penetrating the bladder and making its exit through the pubis. He rode 30 miles, during which the urine passed through the wound. Urine was afterward voided through the left pubic opening, and spicules of bone were discharged for two years afterward; ultimate recovery ensued.

Barkesdale[d] relates the history of the case of a Confederate soldier who was shot at Fredericksburg in the median line of the body, 1½ inches above the symphysis, the wound of exit being in the median line at the back, ½ inch lower down. Urine escaped from both wounds and through the urethra. There were no bad symptoms, and the wounds healed in four weeks.

The bladder is not always injured by penetration of the abdominal wall, but may be wounded by **penetration through the anus or vagina,** or even by an instrument entering the **buttocks** and passing through the smaller sacrosciatic notch. Camper[e] records the case of a sailor who fell from a mast and struck upon some fragments of wood, one of which entered the anus and penetrated the bladder, the result being a rectovesical fistula. About a year later the man consulted Camper, who unsuccessfully attempted

[a] 843, 951. [b] 124, 1869, n. s. lxii., 281. [c] 579, 1867–68, 161.
[d] Virginia Clin. Rec., 1873–74, iii., 367. [e] 641, 296.

to extract the piece of wood; but by incising the fistula it was found that two calculi had formed about the wooden pieces, and when these were extracted the patient recovered. Perrin [a] gives the history of a man of forty who, while adjusting curtains, fell and struck an overturned chair; one of the chair-legs penetrated the anus. Its extraction was followed by a gush of urine, and for several days the man suffered from incontinence of urine and feces. By the tenth day he was passing urine from the urethra, and on the twenty-fifth day there was a complete cicatrix of the parts; fifteen days later he suffered from an attack of retention of urine lasting five days; this was completely relieved after the expulsion of a small piece of trouser-cloth which had been pushed into the bladder at the time of the accident. Post [b] reports the case of a young man who, in jumping over a broomstick, was impaled upon it, the stick entering the anus without causing any external wound, and penetrating the bladder, thus allowing the escape of urine through the anus. A peculiar sequela was that the man suffered from a calculus, the nucleus of which was a piece of the seat of his pantaloons which the stick had carried in.

Couper [c] reports a fatal case of stab-wound of the buttocks, in which the knife passed through the lesser sacrosciatic notch and entered the bladder close to the trigone. The patient was a man of twenty-three, a seaman, and in a quarrel had been stabbed in the buttocks with a long sailor's knife, with resultant symptoms of peritonitis which proved fatal. At the autopsy it was found that the knife had passed through the gluteal muscles and divided part of the great sacrosciatic ligament. It then passed through the small sacrosciatic notch, completely dividing the pudic artery and nerve, and one vein, each end being closed by a clot. The knife entered the bladder close to the trigone, making an opening large enough to admit the index finger. There were well-marked evidences of peritonitis and cellulitis.

Old-time surgeons had considerable difficulty in extracting arrow-heads from persons who had received their injuries while on horseback. Conrad Gesner records an ingenious device of an old surgeon who succeeded in extracting an arrow which had resisted all previous attempts, by placing the subject in the very position in which he was at the time of reception of the wound. The following noteworthy case shows that the bladder may be penetrated by an arrow or bullet entering the buttocks of a person on horseback. Forwood [d] describes the removal of a vesical calculus, the nucleus of which was an iron arrow-head, as follows: "Sitimore, a wild Indian, Chief of the Kiowas, aged forty-two, applied to me at Fort Sill, Indian Territory, August, 1869, with symptoms of stone in the bladder. The following history was elicited: In the fall of 1862 he led a band of Kiowas against the Pawnee Indians, and was wounded in a fight near Fort Larned, Kansas. Being mounted and leaning over his horse, a Pawnee, on foot and within a

[a] 368, No. 49, 1872. [b] 538, 1872, vii., 518. [c] 548, 1879, i., 646. [d] 847, 260.

few paces, drove an arrow deep into his right buttock. The stick was withdrawn by his companions, but the iron point remained in his body. He passed bloody urine immediately after the injury, but the wound soon healed, and in a few weeks he was able to hunt the buffalo without inconvenience. For more than six years he continued at the head of his band, and traveled on horseback, from camp to camp, over hundreds of miles every summer. A long time after the injury he began to feel distress in micturating, which steadily increased until he was forced to reveal this sacred secret (as it is regarded by these Indians), and to apply for medical aid. His urine had often stopped for hours, at which times he had learned to obtain relief by elevating his hips, or lying in different positions. The urine was loaded with blood and mucus and with a few pus globules, and the introduction of a sound indicated a large, hard calculus in the bladder. The Indians advised me approximately of the depth to which the shaft had penetrated and the direction it took, and judging from the situation of the cicatrix and all the circumstances it was apparent that the arrow-head had passed through the glutei muscles and the obturator foramen and entered the cavity of the bladder, where it remained and formed the nucleus of a stone. Stone in the bladder is extremely rare among the wild Indians, owing, no doubt, to their almost exclusive meat diet and the very healthy condition of their digestive organs, and this fact, in connection with the age of the patient and the unobstructed condition of his urethra, went very far to sustain this conclusion. On August 23d I removed the stone without difficulty by the lateral operation through the perineum. The lobe of the prostate was enlarged, which seemed to favor the extent of the incision beyond what would otherwise have been safe. The perineum was deep and the tuberosities of the ischii unnaturally approximated. The calculus of the mixed ammoniaco-magnesian variety was egg-shaped, and weighed 19 drams. The arrow-point was completely covered and imbedded near the center of the stone. It was of iron, and had been originally about 2½ inches long, by ⅛ inch at its widest part, somewhat reduced at the point and edges by oxidation. The removal of the stone was facilitated by the use of two pairs of forceps,—one with broad blades, by which I succeeded in bringing the small end of the stone to the opening in the prostate, while the other, long and narrow, seized and held it until the former was withdrawn. In this way the forceps did not occupy a part of the opening while the large end of the stone was passing through it. The capacity of the bladder was reduced, and its inner walls were in a state of chronic inflammation. The patient quickly recovered from the effects of the chloroform and felt great relief, both in body and mind, after the operation, and up to the eighth day did not present a single unfavorable symptom. The urine began to pass by the natural channel by the third day, and continued more or less until, on the seventh day, it had nearly ceased to flow at the wound. But the restless

spirit of the patient's friends could no longer be restrained. Open hostility with the whites was expected to begin at every moment, and they insisted on his removal. He needed purgative medicine on the eighth day, which they refused to allow him to take. They assumed entire charge of the case, and the following day started with him to their camps 60 miles away. Nineteen days after he is reported to have died ; but his immediate relatives have since assured me that his wound was well and that no trouble arose from it. They described his symptoms as those of bilious remittent fever, a severe epidemic of which was prevailing at the time, and from which several white men and many Indians died in that vicinity." The calculus was deposited in the Army Medical Museum at Washington, and is repre-

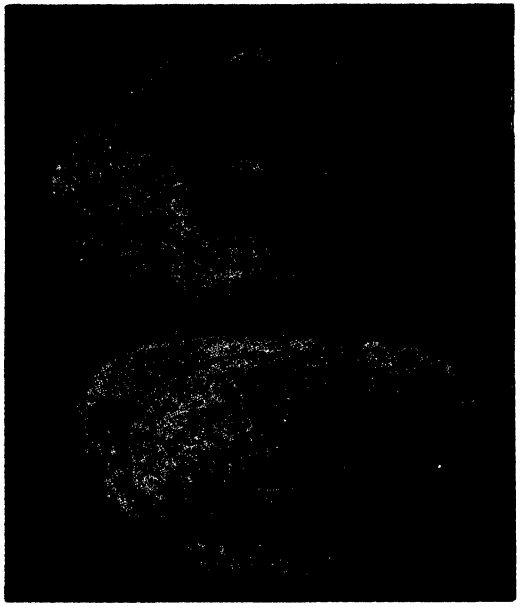


Fig. 225.—Calculus having an arrow-head for a nucleus (Sp. 5931, A. M. M., Wash., D. C.) (Forwood).

sented in the accompanying photograph (Fig. 225), showing a cross-section of the calculus with the arrow-head in situ.

As quoted by Chelius,[265] both Hennen and Cline relate cases in which men have been shot through the skirts of the jacket, the ball penetrating the abdomen above the tuberosity of the ischium, and entering the bladder, and the men have afterward urinated pieces of clothing, threads, etc., taken in by the ball. In similar cases the bullet itself may remain in the bladder and cause the formation of a calculus about itself as a nucleus, as in three cases mentioned by McGuire of Richmond, or the remnants of cloth or spicules of bone may give rise to similar formation.

McGuire[a] mentions the case of a man of twenty-three who was wounded at the Battle of McDowell, May 8, 1862. The ball struck him on the horizontal ramus of the left pubic bone, about an inch from the symphysis, passed through the bladder and rectum, and came out just below the right sacrosciatic notch, near the sacrum. The day after the battle the man was sent to the general hospital at Staunton, Va., where he remained under treatment for four months. During the first month urine passed freely through the wounds made by the entrance and exit of the ball, and was generally mixed with pus and blood. Fecal matter was frequently discharged through the posterior wound. Some time during the third week he passed several small pieces of bone by the rectum. At the end of the fifth week the wound of exit healed, and for the first time after his injury urine was discharged through the urethra. The wound of entrance gradually closed after five months, but opened again in a few weeks and continued, at varying intervals, alternately closed and open until September, 1865. At this time, on sounding the man, it was found that he had stone; this was removed by lateral operation, and was found to weigh 2¼ ounces, having for its nucleus a piece of bone about ½ inch long. Dougherty[b] reports the operation of lithotomy, in which the calculus removed was formed by incrustations about an iron bullet.

In cases in which there is a **fistula of the bladder** the subject may live for some time, in some cases passing **excrement through the urethra,** in others, **urine by the anus.** These cases seem to have been of particular interest to the older writers, and we find the literature of the last century full of examples. Benivenius, Borellus, the Ephemerides, Tulpius, Zacutus Lusitanus, and others speak of excrement passing through the penis; and there are many cases of vaginal anus recorded. Langlet cites an instance in which the intestine terminated in the bladder. Arand[154] mentions recovery after atresia of the anus with passage of excrement from the vulva. Bartholinus, the Ephemerides, Fothergill,[c] de la Croix,[d] Riedlin,[683] Weber, and Zacutus Lusitanus mention instances in which gas was passed by the penis and urethra. Camper[e] records such a case from ulcer of the neighboring or connecting intestine; Frank, from cohesion and suppuration of the rectum; Marcellus Donatus,[f] from penetrating ulcer of the rectum; and Petit,[g] from communication of the rectum and bladder in which a cure was effected by the continued use of the catheter for the evacuation of urine.

Flatus through the vagina, vulva, and from the uterus is mentioned by Bartholinus, the Ephemerides, Meckel, Mauriceau, Paullini, Riedlin, Trnka, and many others in the older literature. Dickinson[h] mentions a Burmese male child, four years old, who had an imperforate anus and urethra, but who passed feces and urine successfully through an opening at the base

[a] 847, 248. [b] 847, 259. [c] 524, ii., 200. [d] 367, 1788, No. 48.
[e] 249, ii., 16. [f] 306, L. iv., c. xxix., 524. [g] 625, T. ii., 94. [h] 476, 1859, i., 534.

of the glans penis. Dickinson eventually performed a successful operation on this case. Modern literature has many similar instances.

In the older literature it was not uncommon to find accounts of persons **passing worms from the bladder,** no explanations being given to account for their presence in this organ. Some of these cases were doubtless instances of echinococcus, trichinæ, or the result of rectovesical fistula, but Riverius[a] mentions an instance in which, after drinking water containing worms, a person passed worms in the urine. In the old Journal de physique de Rozier is an account of a man of forty-five who enjoyed good health, but who periodically urinated small worms from the bladder. They were described as being about 1½ lines long, and caused no inconvenience. There is also mentioned[b] the case of a woman who voided worms from the bladder. Tupper[c] describes a curious case of a woman of sixty-nine who complained of a severe, stinging pain that completely overcame her after micturition. An ulceration of the neck of the bladder was suspected, and the usual remedies were applied, but without effect. An examination of the urine was negative. On recommendation of her friends the patient, before going to bed, steeped and drank a decoction of knot-grass. During the night she urinated freely, and claimed that she had passed a worm about ten inches long and of the size of a knitting-needle. It exhibited motions like those of a snake, and was quite lively, living five or six days in water. The case seems quite unaccountable, but there is, of course, a possibility that the animal had already been in the chamber, or that it was passed by the bowel. A rectovaginal or vesical fistula could account for the presence of this worm had it been voided from the bowel; nevertheless the woman adhered to her statement that she had urinated the worm, and, as confirmatory evidence, never complained of pain after passing the animal.

Foreign bodies in the bladder, other than calculi (which will be spoken of in Chapter XV.), generally gain entrance through one of the natural passages, as a rule being introduced, either in curiosity or for perverted satisfaction, through the urethra. Morand mentions an instance in which a long **wax taper** was introduced into the bladder through the urethra by a man. At the University Hospital, Philadelphia, White has extracted, by median cystotomy, a long wax taper which had been used in masturbation. The cystoscopic examination in this case was negative, and the man's statements were disbelieved, but the operation was performed, and the taper was found curled up and covered by mucus and folds of the bladder. It is not uncommon for **needles, hair-pins,** and the like to form nuclei for incrustations. Gross found three **caudal vertebræ of a squirrel** in the center of a vesical calculus taken from the bladder of a man of thirty-five. It was afterward elicited that the patient had practised urethral masturbation with the tail of this animal. Morand[563] relates the history of a man of sixty-two who introduced a sprig of wheat into his urethra for a supposed therapeutic purpose.

[a] 687, 660. [b] 550, ii., 385. [c] 130, 1864, 78.

It slipped into the bladder and there formed the nucleus of a cluster calculus. Dayot[a] reports a similar formation from the introduction of the stem of a plant. Terrilon[b] describes the case of a man of fifty-four who introduced a **pencil** into his urethra. The body rested fifteen days in this canal, and then passed into the bladder. On the twenty-eighth day he had a chill, and during two days made successive attempts to break the pencil. Following each attempt he had a violent chill and intense evening fever. On the thirty-third day Terrilon removed the pencil by operation. Symptoms of perivesical abscess were present, and seventeen days after the operation, and fifty days after the introduction of the pencil, the patient died. Caudmont[c] mentions a man of twenty-six who introduced a pencil-case into his urethra, from whence it passed into his bladder. It rested about four years in this organ before violent symptoms developed. Perforation of the bladder took place, and the patient died. Poulet[d] mentions the case of a man of seventy-eight, in whose bladder a metallic sound was broken off. The fractured piece of sound, which measured 17 cm. in length, made its exit from the anus, and the patient recovered. Wheeler[e] reports the case of a man of twenty-one who passed a button-hook into his anus, from whence it escaped into his bladder. The hook, which was subsequently spontaneously passed, measured 2½ inches in length and ½ inch in diameter.

Among females, whose urethræ are short and dilatable, foreign bodies are often found in the bladder, and it is quite common for smaller articles of the toilet, such as hair-pins, to be introduced into the bladder, and there form calculi. Whiteside[f] describes a case in which a foreign body introduced into the bladder was mistaken for pregnancy, and giving rise to corresponding symptoms. The patient was a young girl of seventeen who had several times missed her menstruation, and who was considered pregnant. The abdomen was more developed than usual in a young woman. The breasts were voluminous, and the nipples surrounded by a somber areola. At certain periods after the cessation of menstruation, she had incontinence of urine, and had also repeatedly vomited. The urine was of high specific gravity, albuminous, alkaline, and exhaled a disagreeable odor. In spite of the signs of pregnancy already noted, palpitation and percussion did not show any augmentation in the size of the uterus, but the introduction of a catheter into the bladder showed the existence of a large calculus. Under chloroform the calculus and its nucleus were disengaged, and proved to be the **handle of a tooth-brush,** the exact size of which is represented in the accompanying illustration (Fig. 226). The handle was covered with calcareous deposits, and was tightly fixed in the bladder. At first the young woman would give no explanation for its presence, but afterward explained that she had several times used this instrument for relief in retention of urine, and one day it had fallen

[a] 641, 562. [b] 242, 1876, 651. [c] 242, 1850, 354.
[d] 641, 572. [e] 632, 1879, i., 262. [f] 476, Jan. 24, 1874, 127.

into the bladder. A short time after the operation menstruation returned for the first time in seven months, and was afterward normal. Bigelow[a] reports the case of a woman who habitually introduced hair-pins and common pins into her bladder. She acquired this mania after an attempt at dilatation of the urethra in the relief of an obstinate case of strangury. Rodé[368] reports the case of a woman who had introduced a hog's penis into her urethra. It was removed by an incision into this canal, but the patient died in five days of septicemia. There is a curious case quoted[b] of a young domestic of fourteen who was first seen suffering with pain in the sides of the genital organs, retention of urine, and violent tenesmus. She was examined by a midwife who found nothing, but on the following day the patient felt it necessary to go to bed. Her general symptoms persisted, and meanwhile the bladder became much distended. The patient had made allusion to the loss of a hair-pin, a circumstance which corresponded with the beginning of her trouble. Examination showed the orifice of the urethra to be swollen and painful to the touch, and from its canal a hair-pin 6.5 cm. long was extracted. The patient was unable to urinate, and it was necessary to resort to catheterization. By evening the general symptoms had disappeared, and the next day the patient urinated as usual.

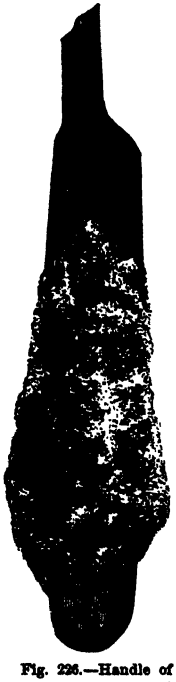


Fig. 236.—Handle of a tooth-brush, removed from the bladder of a young girl.

There are peculiar cases of **hair in the bladder,** in which all history as to the method of entrance is denied, and which leave as the only explanation the possibility that the bladder was in communication with some dermoid cyst. Hamelin[c] mentions a case of this nature. It is said[d] that all his life Sir William Elliot was annoyed by passing hairs in urination. They would lodge in the urethra and cause constant irritation. At his death a stone was taken from the bladder, covered with scurf and hair. Hall[e] relates the case of a woman of sixty, from whose bladder, by dilatation of the urethra, was removed a bundle of hairs two inches long, which, Hall says, without a doubt had grown from the vesical walls.

Retention of Foreign Bodies in the Pelvis.—It is a peculiar fact that foreign bodies which once gain entrance to the pelvis may be tolerated in this location for many years. Baxter[f] describes a man who suffered an injury from a piece of white board which entered his pelvis, and remained in position for sixteen and a half years; at this time a piece of wood 7½ inches

[a] 124, xxix., 57. [b] 641, 637. [c] 302, iv., 432.
[d] 629, 1700, iii., 164. [e] 476, 1860, ii., 461. [f] 218, 1883.

long was discharged at stool, and the patient recovered. Jones[a] speaks of a case in which splinters of wood were retained in the neighborhood of the rectum and vagina for sixteen years, and spontaneously discharged. Barwell[b] mentions a case in which a gum elastic catheter that had been passed into the vagina for the purpose of producing abortion became impacted in the pelvis for twenty months, and was then removed.

Rupture of the Male Urethra.—The male urethra is occasionally ruptured **in violent coitus.** Frank[351] and the Philosophical Transactions[c] are among the older authorities mentioning this accident. In Frank's case there was hemorrhage from the penis to the extent of five pounds. Colles[d] mentions a man of thirty-eight, prone to obesity, and who had been married two months, who said that in sexual congress he had hurt himself by pushing his penis against the pubic bone, and added that he had a pain that felt as though something had broken in his organ. The integuments of the penis became livid and swollen and were extremely painful. His urine had to be drawn by a catheter, and by the fifth day his condition was so bad that an incision was made into the tumor, and pus, blood, urine, and air issued. The patient suffered intense rigors, his abdomen became tympanitic, and he died. Postmortem examination revealed the presence of a ruptured urethra.

Watson[e] relates an instance of coitus performed *en postillon* by a man while drunk, with rupture of the urethra and fracture of the corpus spongiosum only. Loughlin mentions a rupture of the corpus spongiosum during coitus. Frank[351] cites a curious case of hemorrhage from a fall while the penis was erect. It is not unusual to find ruptured urethræ following traumatism, and various explanations are given for it in the standard works on surgery.

Fracture of the Penis.—A peculiar accident to the penis is fracture, which sometimes occurs in coitus. This accident consists in the laceration of the corpora cavernosa, followed by extensive extravasation of blood into the erectile tissue. It has also occurred from injury inflicted accidentally or maliciously, but always happening when the organ was erect. An annoying sequel following this accident is the tendency to curvature in erection, which is sometimes so marked as to interfere with coitus, and even render the patient permanently impotent.[345]

There is an account[f] of a laborer of twenty-seven who, in attempting to micturate with his penis erect, pressed it downward with considerable force and fractured the corpora cavernosa. Veazie[g] relates a case of fracture of the corpora cavernosa occurring in coitus. During the act the female suddenly withdrew, and the male, following, violently struck the pubes, with the resultant injury. Recovery ensued. M'Clellan[h] speaks of removing the

[a] 218, 1856. [b] 650, 1874, viii., 280. [c] 629, No. 4. [d] 313, 1857, xxiii., 375.
[e] 218, 1885, cxiii., 463. [f] Amer. Pract. & News, 1886, ii., 80.
[g] 593, 1884–85, xii., 321. [h] Smith's Med. Jour., 1827, 256.

cavernous septum from a man of fifty-two, in whom this part had become infiltrated with lime-salts and resembled a long, narrow bone. When the penis was erect it was bent in the form of a semicircular bow.

The Transactions of the South Carolina Medical Association [a] contain an account of a negro of sixty who had **urethral stricture** from gonorrhea, and who had been treated for fifteen years by caustics. The penis was seven inches in circumference around the glans, and but little less near the scrotum. The glans was riddled with holes, and numerous fistulæ existed on the inferior surface of the urethra, the meatus being impermeable. So great was the weight and hypertrophy that amputation was necessary. John Hunter speaks of six strictures existing in one urethra at one time; Lallemand of seven; Bolot of eight; Ducamp of five; Boyer thought three could never exist together; Leroy D'Etoilles found 11, and Rokitansky met with four.

Sundry Injuries to the Penis.—Fabricius Hildanus [384] mentions a curious case of paraphimosis caused by violent coitus with a virgin who had an extremely narrow vagina. Joyce [b] relates a history of a stout man who awoke with a vigorous erection, and feeling much irritation, he scratched himself violently. He soon bled copiously, his shirt and underlying sheets and blankets being soaked through. On examination the penis was found swollen, and on drawing back the foreskin a small jet of blood spurted from a small rupture in the frenum. The authors have knowledge of a case in which hemorrhage from the frenum proved fatal. The patient, in a drunken wager, attempted to circumcise himself with a piece of tin, and bled to death before medical aid could be summoned. It sometimes happens that the virile member is amputated by an animal bite. Paullini [620] and Celliez [c] mention amputation of the penis by a dog-bite. Morgan [d] describes a boy of thirteen who was feeding a donkey which suddenly made a snap at him, unfortunately catching him by the trousers and including the penis in one of the folds. By the violence of the bite the boy was thrown to the ground, and his entire prepuce was stripped off to the root as if it had been done by a knife. There was little hemorrhage, and the prepuce was found in the trousers, looking exactly like the finger of a glove. Morgan stated that this was the third case of the kind of which he had knowledge. Bookey [e] records a case in which an artilleryman was seized by the penis by an infuriated horse, and the two crura were pulled out entire.

Amputation of the penis is not always followed by loss of the sexual power and instinct, but sometimes has the mental effect of temporarily increasing the desire. Haslam [f] reports the case of a man who slipped on the greasy deck of a whaler, and falling forward with great violence upon a large knife used to cut blubber, completely severed his penis, beside inflicting a wound in the abdomen through which the intestines protruded. After re-

[a] 1874–77, 90–92. [b] 224, 1869, i., 209. [c] 462, T. xx., 169.
[d] 536, 1869, vii., 31. [e] Indian Med. Jour., 1886, v., 647. [f] 476, 1828.

covery there was a distinct increase of sexual desire and frequent nocturnal emissions. In the same report there is recorded the history of a man who had entirely lost his penis, but had supplied himself with an ivory succedaneum. This fellow finally became so libidinous that it was necessary to exclude him from the workhouse, of which he was an inmate.

Norris[a] gives an account of a private who received a **gunshot wound of the penis** while it was partly erect. The wound was acquired at the second battle of Fredericksburg. The ball entered near the center of the glans penis, and taking a slightly oblique direction, it passed out of the right side of the penis 1½ inches beyond the glans; it then entered the scrotum, and after striking the pelvis near the symphysis, glanced off around the innominate bone, and finally made its exit two inches above the anus. The after-effects of this injury were incontinence of urine, and inability to assume the erect position.

Bookey[b] cites the case of **six wounds from one bullet** with recovery. The bullet entered the sole and emerged from the dorsum of the foot. It then went through the right buttock and came out of the groin, only to penetrate the dorsum of the penis and emerge at the upper part of the glans. Rose[c] speaks of a case in which a man had his clothes caught in machinery, drawing in the external genital organs. The testicles were found to be uninjured, but the penis was doubled out of sight and embedded in the scrotum, from whence it was restored to its natural position and the man recovered.

Nélaton[d] describes a case of **luxation of the penis** in a lad of six who fell from a cart. Nélaton found the missing member in the scrotum, where it had been for nine days. He introduced Sir Astley Cooper's instrument for tying deeply-seated arteries through a cutaneous tube, and conducting the hook under the corporus cavernosum, seized this crosswise, and by a to-and-fro movement succeeded in replacing the organ.

Moldenhauer[e] describes the case of a farmer of fifty-seven who was injured in a runaway accident, a wheel passing over his body close to the abdomen. The glans penis could not be recognized, since the penis in toto had been torn from its sheath at the corona, and had slipped or been driven into the inguinal region. This author quotes Stromeyer's case,[f] which was that of a boy of four and a half years who was kicked by a horse in the external genital region. The sheath was found empty of the penis, which had been driven into the perineum.

Raven[g] mentions a case of **spontaneous retraction of the penis** in a man of twenty-seven. While in bed he felt a sensation of coldness in the penis, and on examination he found the organ (a normal-sized one) rapidly retracting or shrinking. He hastily summoned a physician, who found that

[a] 124, 1864. [b] Indian Med. Jour., 1886, v., 647. [c] 476, 1866, i., 67.
[d] 363, 1850, No. 86. [e] 703, 1876, 232, n. s., xiii.
[f] "Handbook of Surgery," ii., 774. [g] 476, 1886, ii., 250

the penis had, in fact, almost disappeared, the glans being just perceptible under the pubic arch, and the skin alone visible. The next day the normal condition was restored, but the patient was weak and nervous for several days after his fright. In a similar case, mentioned by Ivanhoff, the penis of a peasant of twenty-three, a married man, bodily disappeared, and was only captured by repeated effort. The patient was six days under treatment, and he finally became so distrustful of his virile member that, to be assured of its constancy, he tied a string about it above the glans.

Injuries of the penis and testicles self-inflicted are grouped together and discussed in Chapter XIV.

As a rule, **spontaneous gangrene of the penis** has its origin in some intense fever. Partridge[a] describes a man of forty who had been the victim of typhus fever, and whose penis mortified and dried up, becoming black and like the empty finger of a cast-off glove; in a few days it dropped off. Boyer[b] cites a case of edema of the prepuce, noticed on the fifteenth day of the fever, and which was followed by gangrene of the penis. Rostan[c] mentions gangrene of the penis from small-pox. Intermittent fever has been cited as a cause.[d] Koehler[e] reports a fatal instance of gangrene of the penis, caused by a prostatic abscess following gonorrhea. In this case there was thrombosis of the pelvic veins. Hutchinson[f] mentions a man who, thirty years before, after six days' exposure on a raft, had lost both legs by gangrene. At the age of sixty-six he was confined to bed by subacute bronchitis, and during this period his whole penis became gangrenous and sloughed off. This is quite unusual, as gangrene is usually associated with fever; it is more than likely that the gangrene of the leg was not connected with that of the penis, but that the latter was a distinct after-result. Possibly the prolonged exposure at the time he lost his legs produced permanent injury to the blood-vessels and nerves of the penis. There is a case on record in which, in a man of thirty-seven, gangrene of the penis followed delirium tremens, and was attributed to alcoholism.[g] Quoted by Jacobson,[448] Troisfontaines records a case of gangrene of the skin and body of the penis in a young man, and without any apparent cause. Schutz[h] speaks of **regeneration of the penis** after gangrenous destruction.

Gangrene of the penis does not necessarily hinder the performance of marital functions. Chance[i] mentions a man whose penis sloughed off, leaving only a nipple-like remnant. However, he married four years later, and always lived in harmony with his wife. At the time of his death he was the father of a child, subsequent to whose birth his wife had miscarried, and at the time of report she was daily expecting to be again confined.

Willett[j] relates the instance of a horseman of thirty-three who, after

[a] 779, xvi., 792. [b] "Traité des Mal. Chirurg." [c] 363, 1853. [d] 260, Band., viii., 1874.
[e] 260, 1891. [f] 160, ii., 364. [g] Rev. Méd. de la Suisse Romande, 1888.
[h] 736, ii., 53. [i] 313, xxxii. [j] Med. and Surg. Month., 1866, i., 102.

using a combination of refuse oils to protect his horse from gnats, was prompted to urinate, and, in so doing, accidentally touched his penis with the mixture. Sloughing phagedena rapidly ensued, but under medical treatment he eventually recovered.

Priapism is sometimes seen as a curious symptom of lesion of the spinal cord. In such cases it is totally unconnected with any voluptuous sensation, and is only found accompanied by motor paralysis. It may occur spontaneously immediately after accident involving the cord, and is then probably due to undue excitement of the portion of the cord below the lesion, which is deprived of the regulating influence of the brain. Priapism may also develop spontaneously at a later period, and is then due to central irritation from extravasation into the substance of the cord, or to some reflex cause. It may also occur from simple concussion, as shown by a case reported by Le Gros Clark. Pressure on the cerebellum is supposed to account for cases of priapism observed in executions and suicides by hanging. There is an instance recorded of an Italian "castrata" who said he provoked sexual pleasure by partially hanging himself. He accidentally ended his life in pursuance of this peculiar habit. The facts were elicited by testimony at the inquest.

There are, however, in literature, records of **long continued priapism** in which either the cause is due to excessive stimulation of the sexual center, or in which the cause is obscure or unknown. There may or may not be accompanying voluptuous feelings. The older records contain instances of continued infantile priapism caused by the constant irritation of ascarides, and also records of prolonged priapism associated with intense agony and spasmodic cramps. Zacutus Lusitanus[831] speaks of a Viceroy of India who had a long attack of stubborn priapism without any voluptuous feeling. Gross refers to prolonged priapism, and remarks that the majority of cases seem to be due to excessive coitus.

Moore[a] reports a case in a man of forty who had been married fifteen years, and who suffered spasmodic contractions of the muscles of the penis after an incomplete coitus. This pseudopriapism continued for twenty-three days, during which time he had unsuccessfully resorted to the application of cold, bleeding, and other treatment; but on the twenty-sixth day, after the use of bladders filled with cold water, there was a discharge from the urethra of a glairy mucus, similar in nature to that in seminal debility. There was then complete relaxation of the organ. During all this time the man slept very little, only occasionally dozing. Donne[b] describes an athletic laborer of twenty-five who received a wound from a rifle-ball penetrating the cranial parietes immediately in the posterior superior angle of the parietal bone, and a few lines from the lambdoid suture. The ball did not make egress, but passed posteriorly downward. Reaction was established on the third day, but the inflammatory symptoms influenced the genitalia. Priapism began

[a] 129, 1823. [b] 818, 1835, ii., 295.

on the fifth day, at which time the patient became affected with a salacious appetite, and was rational upon every subject except that pertaining to venery. He grew worse on the sixth day, and his medical adviser was obliged to prohibit a female attendant. Priapism continued, but the man went into a soporose condition, with occasional intervals of satyriasis. In this condition he survived nine days; there was not the slightest abatement of the priapism until a few moments before his death. Tripe[a] relates the history of a seaman of twenty-five, in perfect health, who, arriving from Calcutta on April 12, 1884, lodged with a female until the 26th. At this time he experienced an unusually fierce desire, with intense erection of the penis which, with pain, lasted throughout the night. Though coitus was frequently resorted to, these symptoms continued. He sought aid at the London Hospital, but the priapism was persistent, and when he left, on May 10th, the penis formed an acute angle with the pubes, and he again had free intercourse with the same female. At the time of leaving England the penis made an angle of about 45° with the pubes, and this condition, he affirmed, lasted three months. On his return to England his penis was flaccid, and his symptoms had disappeared.

Salzer[b] presents an interesting paper on priapism which was quoted in The Practitioner of London. Salzer describes one patient of forty-six who awoke one morning with a strong erection that could not be reduced by any means. Urine was voided by jerks and with difficulty, and only when the subject was placed in the knee and elbow position. Despite all treatment this condition continued for seven weeks. At this time the patient's spleen was noticed to be enormously enlarged. The man died about a year after the attack, but a necropsy was unfortunately refused. Salzer, in discussing the **theories of priapism,** mentions eight cases previously reported, and concludes, that such cases are attributable to leukemia. Kremine believes that continued priapism is produced by effusion of blood into the corpora cavernosa, which is impeded on its return. He thinks it corresponds to bleeding at the nose and rectum, which often occurs in perfectly healthy persons. Longuet regards the condition of the blood in leukemia as the cause of such priapism, and considers that the circulation of the blood is retarded in the smaller vessels, while, owing to the great increase in the number of white corpuscles, thrombi are formed. Neidhart and Matthias conclude that the origin of this condition might be sought for in the disturbance of the nerve-centers. After reviewing all these theories, Salzer states that in his case the patient was previously healthy and never had suffered the slightest hemorrhage in any part, and he therefore rejects the theory of extravasation. He is inclined to suppose that the priapism was due to the stimulation of the nervi erigentes, brought about either by anatomic change in the nerves themselves, or by pressure upon them by enlarged lumbar glands, an associate condition of leukemia.

[a] 476, 1845, ii., 8.

[b] 199, No. 11, 1879.

Burchard[a] reports a most interesting case of prolonged priapism in an English gentleman of fifty-three. When he was called to see the man on July 15th he found him suffering with intense pain in the penis, and in a state of extreme exhaustion after an erection which had lasted five hours uninterruptedly, during the whole of which time the organ was in a state of violent and continuous spasm. The paroxysm was controlled by $\frac{3}{4}$ grain morphin and $\frac{1}{50}$ grain atropin. Five hours later, after a troubled sleep, there was another erection, which was again relieved by hypodermic medication. During the day he had two other paroxysms, one lasting forty-five minutes, and another, three hours later, lasting eighteen minutes. Both these were controlled by morphin. There was no loss of semen, but after the paroxysms a small quantity of glairy mucus escaped from the meatus. The rigidity was remarkable, simulating the spasms of tetanus. No language could adequately describe the suffering of the patient. Burchard elicited the history that the man had suffered from nocturnal emissions and erotic dreams of the most lascivious nature, sometimes having three in one night. During the day he would have eight or ten erections, unaccompanied by any voluptuous emotions. In these there would rarely be any emission, but occasionally a small mucous discharge. This state of affairs had continued three years up to the time Burchard saw him, and, chagrined by pain and his malady, the patient had become despondent. After a course of careful treatment, in which diet, sponging, application of ice-bags, and ergot were features, this unfortunate man recovered.

Bruce[b] mentions the case of an Irishman of fifty-five who, without apparent cause, was affected with a painful priapism which lasted six weeks, and did not subside even under chloroform. Booth[c] mentions a case of priapism in a married seaman of fifty-five, due to local inflammation about the muscles, constricting the bulb of the penis. The affection lasted five weeks, and was extremely painful. There was a similar case of priapism which lasted for three weeks, and was associated with hydrocele in a man of forty-eight.[d]

Injuries of the testicle and scrotum may be productive of most serious issue. It is a well-known surgical fact that a major degree of shock accompanies a contusion of this portion of the body. In fact, Chevers[266] states that the sensitiveness of the testicles is so well known in India, that there are cases on record in which premeditated murder has been effected by Cossiah women, by violently squeezing the testicles of their husbands. He also mentions another case in which, in frustrating an attempt at rape, death was caused in a similar manner. Stalkartt[e] describes the case of a young man who, after drinking to excess with his paramour, was either unable, or indifferent in gratifying her sexual desire. The woman became so enraged that

[a] 597, 1887, xlv., 66. [b] 476, 1873, i., 90. [c] 476, 1887, i., 978.
[d] 476, 1863, ii., 162. [e] 224, 1890, ii., 1411.

she seized the scrotum and wrenched it from its attachments, exposing the testicles. The left testicle was completely denuded, and was hanging by the vas deferens and the spermatic vessels. There was little hemorrhage, and the wound was healed by granulation.

Avulsion of the male external genitalia is not always accompanied by serious consequences, and even in some cases the sexual power is preserved. Knoll[a] described a case in 1781, occurring in a peasant of thirty-six who fell from a horse under the wheels of a carriage. He was first caught in the revolving wheels by his apron, which drew him up until his breeches were entangled, and finally his genitals were torn off. Not feeling much pain at the time, he mounted his horse and went to his house. On examination it was found that the injury was accompanied with considerable hemorrhage. The wound extended from the superior part of the pubes almost to the anus; the canal of the urethra was torn away, and the penis up to the neck of the bladder. There was no vestige of either the right scrotum or testicle. The left testicle was hanging by its cord, enveloped in its tunica vaginalis. The cord was swollen and resembled a penis stripped of its integument. The prostate was considerably contused. After two months of suffering the patient recovered, being able to evacuate his urine through a fistulous opening that had formed. In ten weeks cicatrization was perfect. In his "Memoirs of the Campaign of 1811," Larrey describes a soldier who, while standing with his legs apart, was struck from behind by a bullet. The margin of the sphincter ani, the skin of the perineum, the bulbous portion of the urethra, some of the skin of the scrotum, and the right testicle were destroyed. The spermatic cord was divided close to the skin, and the skin of the penis and prepuce was torn. The soldier was left as dead on the field, but after four months' treatment he recovered.

Madden[b] mentions a man of fifty who fell under the feet of a pair of horses, and suffered avulsion of the testicles through the scrotum. The organs were mangled, the spermatic cord was torn and hung over the anus, and the penis was lacerated from the frenum down. The man lost his testicles, but otherwise completely recovered. Brugh[c] reports an instance of injury to the genitalia in a boy of eighteen who was caught in a threshing-machine. The skin of the penis and scrotum, and the tissue from the pubes and inguinal region were torn from the body. Cicatrization and recovery were complete. Brigham[d] cites an analogous case in a youth of seventeen who was similarly caught in threshing machinery. The skin of the penis and the scrotum was entirely torn away; both sphincters of the anus were lacerated, and the perineum was divested of its skin for a space 2½ inches wide. Recovery ensued, leaving a penis which measured, when flaccid, three inches long and 1½ inches in diameter.

[a] 682, vii., 594.
[b] 548, 1857, 260.
[c] 545, 1877, 207.
[d] West. Lancet, Cincin., 1875–76, iv., 517.

There is a case reported [a] of a man who had his testicles caught in machinery while ginning cotton. The skin of the penis was stripped off to its root, the scrotum torn off from its base, and the testicles were contused and lacerated, and yet good recovery ensued. A peculiarity of this case was the persistent erection of the penis when cold was not applied.

Gibbs [b] mentions a case in which the entire scrotum and the perineum, together with an entire testicle and its cord attached, and nearly all the integument of the penis were torn off, yet the patient recovered with preservation of sexual powers. The patient was a negro of twenty-two who, while adjusting a belt, had his coat (closely buttoned) caught in the shafting, and his clothes and external genitals torn off. On examination it was found that the whole scrotum was wrenched off, and also the skin and cellular tissue, from 2½ inches above the spine of the pubes down to the edge of the sphincter ani, including all the breadth of the perineum, together with the left testicle with five inches of its cord attached, and all the integument and cellular covering of the penis except a rim nearly half an inch wide at the extremity and continuous with the mucous membrane of the prepuce. The right testicle was hanging by its denuded cord, and was apparently covered only by the tunica vaginalis as high up as the abdominal ring, where the elastic feeling of the intestines was distinctly perceptible. There was not more than half an ounce of blood lost. The raw surface was dressed, the gap in the perineum brought together, and the patient made complete recovery, with preservation of his sexual powers. Other cases of injuries to the external genital organs (self-inflicted) will be found in the next chapter.

The preservation of the sexual power after injuries of this kind is not uncommon. There is a case reported [c] of a man whose testicles were completely torn away, and the perineal urethra so much injured that micturition took place through the wound. After a tedious process the wound healed and the man was discharged, but he returned in ten days with gonorrhea, stating that he had neither lost sexual desire nor power of satisfaction. Robbins [d] mentions a man of thirty-eight who, in 1874, had his left testicle removed. In the following year his right testicle became affected and was also removed. The patient stated that since the removal of the second gland he had regular sexual desire and coitus, apparently not differing from that in which he indulged before castration. For a few months previous to the time of report the cord on the left side, which had not been completely extirpated, became extremely painful and was also removed.

Atrophy of the testicle may follow venereal excess, and according to Larrey, deep wounds of the neck may produce the same result, with the loss of the features of virility. Guthrie [e] mentions a case of spontaneous absorption of the testicle. According to Larrey, on the return of the French Army

[a] 760, 1886–87, iv., 300. [b] 264, 1855, 154. [c] 224, 1885, 375.
[d] Quoted 224, 1881, i., 171. [e] 476, 1832, ii., 670.

from the Egyptian expedition the soldiers complained of atrophy and disappearance of the testicle, without any venereal affection. The testicle would lose its sensibility, become soft, and gradually diminish in size. One testicle at a time was attacked, and when both were involved the patient was deprived of the power of procreation, of which he was apprised by the lack of desire and laxity of the penis. In this peculiar condition the general health seemed to fail, and the subjects occasionally became mentally deranged. Atrophy of the testicles has been known to follow an attack of mumps.

In his description of the diseases of Barbadoes Hendy mentions several peculiar cases under his observation in which the scrotum sloughed, leaving the testicles denuded. Alix and Richter[a] mention a singular modification of rheumatic inflammation of the testicle, in which the affection flitted from one testicle to the other, and alternated with rheumatic pains elsewhere.

There is a case of **retraction of the testicle** reported[b] in a young soldier of twenty-one who, when first seen, complained of a swelling in the right groin. He stated that while riding bareback his horse suddenly plunged and threw him on the withers. He at once felt a sickening pain in the groin and became so ill that he had to dismount. On inspection an oval tumor was seen in the groin, tender to the touch and showing no impulse on coughing. The left testicle was in its usual position, but the right was absent. The patient stated positively that both testicles were in situ before the accident. An attempt at reduction was made, but the pain was so severe that manipulation could not be endured. A warm bath and laudanum were ordered, but unfortunately, as the patient at stool gave a sudden bend to the left, his testicle slipped up into the abdomen and was completely lost to palpation. Orchitis threatened, but the symptoms subsided; the patient was kept under observation for some weeks, and then as a tentative measure, discharged to duty. Shortly afterward he returned, saying that he was ill, and that while lifting a sack of corn his testicle came partly down, causing him great pain. At the time of report his left testicle was in position, but the right could not be felt. The scrotum on that side had retracted until it had almost disappeared; the right external ring was very patent, and the finger could be passed up in the inguinal canal; there was no impulse on coughing and no tendency to hernia.

A unique case of **ectopia of the testicle** in a man of twenty-four is given by Popoff.[c] The scrotum was normally developed, and the right testicle in situ. The left half of the scrotum was empty, and at the root of the penis there was a swelling the size of a walnut, covered with normal skin, and containing an oval body about four-fifths the size of the testicle, but softer in constituency. The patient claimed that this swelling had been present since childhood. His sexual power had been normal, but for the past six months he had been impotent. In childhood the patient had a small inguinal hernia, and Popoff thought this caused the displacement of the testicle.

[a] 535, lxi. [b] 224, 1885, i., 536. [c] 812, No. 4, 1888, 75.

A somewhat similar case occurred in the Hôtel-Dieu, Paris. Through the agency of compression one of the testes was forced along the corpus cavernosum under the skin as far as the glans penis. It was easily reduced, and at a subsequent autopsy it was found that it had not been separated from the cord. Guitéras [a] cites a parallel case of dislocation of the testicle into the penis. It was the result of traumatism—a fall upon the wheel of a cart. It was reduced under anesthesia, after two incisions had been made, the adhesions broken up, and the shrunken sac enlarged by stretching.

Rupture of the spermatic arteries and veins has caused sudden death. Schleiser [b] is accredited with describing an instance in which a healthy man was engaged in a fray in the dark, and, suddenly crying out, fell into convulsions and died in five minutes. On examination the only injury found was the rupture of both spermatic arteries at the internal ring, produced by a violent pull on the scrotum and testicles by one of his antagonists. Shock was evidently a strong factor in this case. Fabricius Hildanus [c] gives a case of impotency due to lesions of the spermatic vessels following a burn. There is an old record [d] of an aged man who, on marrying, found that he had erections but no ejaculations. He died of ague, and at the autopsy it was found that the verumontanum was hard and of the size of a walnut, and that the ejaculatory ducts contained calculi about the size and shape of peas.

Hydrocele is a condition in which there is an abnormal quantity of fluid in the tunica vaginalis. It is generally caused by traumatism, violent muscular efforts, or straining, and is much more frequent in tropic countries than elsewhere. It sometimes attains an enormous size. Leigh [488] mentions a hydrocele weighing 120 pounds, and there are records of hydroceles weighing 40 [e] and 60 pounds.[f] Larrey speaks of a sarcocele in the coverings of the testicle which weighed 100 pounds. Mursinna [577] describes a hydrocele which measured 27 inches in its longest and 17 in its transverse axis.

Tedford [g] gives a curious case of **separation of the ovary** in a woman of twenty-eight. After suffering from invagination of the bowel and inflammation of the ovarian tissue, an ovary was discharged through an opening in the sigmoid flexure, and thence expelled from the anus.

In discussing **injuries of the vagina,** the first to be mentioned will be a remarkable case reported by Curran.[h] The subject was an Irish girl of twenty. While carrying a bundle of clothes that prevented her from seeing objects in front of her, she started to pass over a stile, just opposite to which a goat was lying. The woman wore no underclothing, and in the ascent her body was partially exposed, and, while in this enforced attitude, the goat

[a] 538, Jan. 4, 1896. [b] Casper's Wocheuschrift, Oct. 22, 1842.
[c] 334, cent. v., obs. xl. [d] 215, Ann. 2. [e] 106, 1725, 492.
[f] Mém. de la Acad. des Sciences de Paris, 1711, 30. [g] 701, 1886. [h] 536, 1837, i., 116.

frightened by her approach, suddenly started up, and in so doing thrust his horn forcibly into her anus and about two or three inches up her rectum. The horn then passed through the bowel and its coverings, just above the hymen, and was then withdrawn as she flinched and fell back. The resultant wound included the lower part of the vagina and rectum, the sphincter ani, the fourchet, and perineum. Hemorrhage was profuse, and the wound caused excruciating pain. The subject fainted on the spot from hemorrhage and shock. Her modesty forbade her summoning medical aid for three days, during which time the wound was undergoing most primitive treatment. After suturing, cicatrization followed without delay.

Trompert[a] mentions a case of rupture of the vagina by the horn of a bull. There is a case recorded in the Pennsylvania Hospital Reports[623] of a girl of nineteen who jumped out of a second-story window. On reaching the ground, her foot turned under her as she fell. The high heel of a French boot was driven through the perineum one inch from the median line, midway between the anus and the posterior commissure of the labia majora. The wound extended into the vagina above the external opening, in which the heel, now separated from the boot, projected, and whence it was removed without difficulty. This wound was the only injury sustained by the fall.

Beckett[b] records a case of impalement in a woman of forty-five who, while attempting to obtain water from a hogshead, fell with one limb inside the cistern, striking a projecting stave three inches wide and ½ inch thick. The external labia were divided, the left crus of the clitoris separated, the nymphæ lacerated, and the vaginal wall penetrated to the extent of five inches; the patient recovered by the fourth week.

Homans[c] reports recovery from extensive wounds acquired by a negress who fell from a roof, striking astride an upright barrel. There was a wound of the perineum, and penetration of the posterior wall of the vagina, with complete separation of the soft parts from the symphysis pubis, and extrusion of the bladder.

Howe[d] reports a case of impalement with recovery in a girl of fifteen who slid down a hay-stack, striking a hay-hook which penetrated her perineum and passed into her body, emerging two inches below the umbilicus and one inch to the right of the median line.

Injuries of the vagina may be so extensive as to allow **protrusion of the intestines,** and some horrible cases of this nature are recorded. In The Lancet for 1873[e] there is reported a murder or suicide of this description. The woman was found with a wound in the vagina, through which the intestines, with clean-cut ends, protruded. Over 7½ feet of the intestines had been cut off in three pieces. The cuts were all clean and carefully separated from the mesentery. The woman survived her injuries a whole week, finally

[a] 587, xix., 311. [b] Med. Annals, Albany, 1881, ii., 136.
[c] 218, 1883, cviii., 344. [d] 218, 1840, xxii., 71. [e] 476, 1873, i., 673.

succumbing to loss of blood and peritonitis. Her husband was tried for murder, but was acquitted by a Glasgow jury. Taylor[756] mentions similar cases of two women murdered in Edinburgh some years since, the wounds having been produced by razor slashes in the vagina. Taylor remarks that this crime seems to be quite common in Scotland. Starkey[a] reports an instance in which the body of an old colored woman was found, with evidences of vomiting, and her clothing stained with blood that had evidently come from her vagina. A postmortem showed the abdominal cavity to be full of blood; at Douglas' culdesac there was a tear large enough to admit a man's hand, through which protruded a portion of the omentum; this was at first taken for the membranes of an abortion. There were distinct signs of acute peritonitis. After investigation it was proved that a drunken glass-blower had been seen leaving her house with his hand and arm stained with blood. In his drunken frenzy this man had thrust his hand into the vagina, and through the junction of its posterior wall with the uterus, up into the abdominal cavity, and grasped the uterus, trying to drag it out. Outside of obstetric practice the injury is quite a rare one.

There is a case of death from a **ruptured clitoris** reported by Gutteridge.[b] The woman was kicked while in a stooping position and succumbed to a profuse hemorrhage, estimated to be between three and four pounds, and proceeding from a rupture of the clitoris.

Discharge of Vaginal Parietes.—Longhi[c] describes the case of a woman of twenty-seven, an epileptic, with metritis and copious catamenia twice a month. She was immoderately addicted to drink and sexual indulgence, and in February, 1835, her menses ceased. On May 8th she was admitted to the hospital with a severe epileptic convulsion, and until the 18th remained in a febrile condition, with abdominal tenderness, etc. On the 21st, while straining as if to discharge the contents of the rectum, she felt a voluminous body pass through the vagina, and fancied it was the expected fetus. After washing this mass it was found to be a portion of the vaginal parietes and the fleshy body of the neck of the uterus. The woman believed she had miscarried, and still persisted in refusing medicine. Cicatrization was somewhat delayed; immediately on leaving the hospital she returned to her old habits, but the pain and hemorrhage attending copulation was so great that she had finally to desist. The vagina, however, gradually yielding, ceased to interfere with the gratification of her desires. Toward the end of June the menses reappeared and flowed with the greatest regularity. The portions discharged are preserved in the Milan Hospital.

The **injuries** received **during coitus** have been classified by Spaeth as follows: Deep tears of the hymen with profuse hemorrhage; tears of the clitoris and of the urethra (in cases of atresia hymenis); vesicovaginal fistula; laceration of the vaginal fornices, posteriorly or laterally; laceration

[a] 453, 1889-90. [b] 476, 1846, ii., 478. [c] 376, No. 22.

of the septum of a duplex vagina; injuries following coitus after perineorrhaphy. In the last century Plazzoni reports a case of vaginal rupture occurring during coitus. Green of Boston; Mann of Buffalo; Sinclair and Munro of Boston, all mention lacerations occurring during coitus. There is an instance recorded[a] of extensive laceration of the vagina in a woman, the result of coitus with a large dog. Haddon and Ross[b] both mention cases of rupture of the vagina in coitus; and Martin[c] reports a similar case resulting in a young girl's death. Spaeth[d] speaks of a woman of thirty-one who, a few days after marriage, felt violent pain in coitus, and four days later she noticed that fecal matter escaped from the vagina during stool. Examination showed that the columns of the posterior wall were torn from their attachment, and that there was a rectovaginal fistula admitting the little finger. Hofmokl[e] cites an instance in which a powerful young man, in coitus with a widow of fifty-eight, caused a tear of her fornix, followed by violent hemorrhage. In another case by the same author, coitus in a sitting posture produced a rupture of the posterior fornix, involving the peritoneum; although the patient lost much blood, she finally recovered. In a third instance, a young girl, whose lover had violent connection with her while she was in an exaggerated lithotomy position, suffered a large tear of the right vaginal wall. Hofmokl also describes the case of a young girl with an undeveloped vagina, absence of the uterus and adnexa, who during a forcible and unsuccessful attempt at coitus, had her left labium majus torn from the vaginal wall. The tear extended into the mons veneris and down to the rectum, and the finger could be introduced into the vaginal wound to the depth of two inches. The patient recovered in four weeks, but was still anemic from the loss of blood.

Crandall[f] cites instances in which hemorrhage, immediately after coitus of the marriage-night, was so active as to almost cause death. One of his patients was married three weeks previously, and was rapidly becoming exhausted from a constant flowing which started immediately after her first coitus. Examination showed this to be a case of active intrauterine hemorrhage excited by coitus soon after the menstrual flow had ceased and while the uterus and ovaries were highly congested. In another case the patient commenced flooding while at the dinner table in the Metropolitan Hotel in New York, and from the same cause an almost fatal hemorrhage ensued. Hirst of Philadelphia has remarked that brides have been found on their marital beds completely covered with blood, and that the hemorrhage may have been so profuse as to soak through the bed and fall on the floor. Lacerations of the urethra from urethral coitus in instances of vaginal atresia or imperforate hymen may also excite serious hemorrhage.

Foreign Bodies in the Vagina.—The elasticity of the vagina allows the presence in this passage of the most voluminous foreign bodies. When we

[a] St. Louis Med. Review, April, 1893. [b] 252, 1876. [c] 435, 1873.
[d] 832, Band xix. [e] International Klin., Rundschau, 1890. [f] 545, 1876.

consider the passage of a fetal head through the vagina the ordinary foreign bodies, none of which ever approximate this size, seem quite reasonable. Goblets, hair-pins, needles, bottles, beer glasses, compasses, bobbins, pessaries, and many other articles have been found in the vagina. It is quite possible for a phosphatic incrustation to be found about a foreign body tolerated in this location for some time. Hubbauer [a] speaks of a young girl of nineteen in whose vagina there was a glass fixed by incrustations which held it solidly in place. It had been there for six months and was only removed with great difficulty. Holmes [b] cites a peculiar case in which the neck of a bottle was found in the vagina of a woman. One point of the glass had penetrated the bladder and a calculus had formed on this as well as on the vaginal end.

When a foreign body remains in the vagina for a long time and if it is composed of material other than glass, it becomes influenced by the corrosive action of the vaginal secretion. For instance, Cloquet removed a foreign body which was incrusted in the vagina, and found the cork pessary which had formed its nucleus completely rotted. A similar instrument found by Gosselin [c] had remained in the vagina thirty-six years, and was incrustated with calcareous salts. Metal is always attacked by the vaginal secretions in the most marked manner. Cloquet mentions that at an autopsy of a woman who had a pewter goblet in her vagina, lead oxid was found in the gangrenous debris.

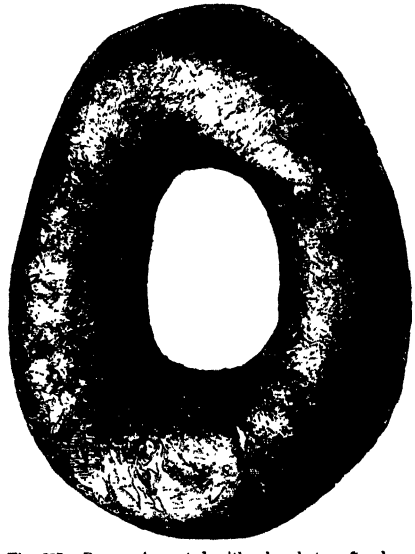


Fig. 227.—Pessary incrusted with phosphates after long sojourn in the vagina (after Poulet).

Long Retention of Pessaries, etc.—The length of time during which pessaries may remain in the vagina is sometimes astonishing. The accompanying illustration (Fig. 227) shows the phosphatic deposits and incrustations around a pessary after a long sojourn in the vagina. The specimen is in the Musée Dupuytren. Pinet mentions a pessary that remained in situ for twenty-five years. Gerould of Massilon, Ohio, reports a case in which a pessary had been worn by a German woman of eighty-four for more than fifty years. She had forgotten its existence until reminded of it by irritation some years before death. It was remarkable that when the pessary was removed it was found to have largely retained its original wax covering. Hurxthal [d] mentions the

[a] 841, 613. [b] 490, 1854. [c] 363, 1846. [d] 612, 1851.

removal of a pessary which had been in the pelvis for forty-one years. Jackson[a] speaks of a glove-pessary remaining in the vagina thirty-five years. Mackey[b] reports the removal of a glass pessary after fifty-five years' incarceration.

There is an account[c] of a young girl addicted to onanism who died from the presence of a pewter cup in her vagina; it had been there fourteen months. Shame had led her to conceal her condition for all the period during which she suffered pain in the hypogastrium, and diarrhea. She had steadily refused examination. Bazzanella of Innsbruck removed a drinking glass from the vagina by means of a pair of small obstetric forceps. The glass had been placed there ten years previously by the woman's husband. Szigethy[d] reports the case of a woman of seventy-five who, some thirty years before, introduced into her vagina a ball of string previously dipped in wax. The ball was effectual in relieving a prolapsed uterus, and was worn with so little discomfort that she entirely forgot it until it was forced out of place by a violent effort. The ball was seven inches in circumference, and covered with mucus, but otherwise unchanged. Breisky[644] is accredited with the report of a case of a woman suffering with dysmenorrhea, in whose vagina was found a cotton reel which had been introduced seven years before. The woman made a good recovery. Pearse[e] mentions a woman of thirty-six who had suffered menorrhagia for ten days, and was in a state of great prostration and suffering from strong colicky pains. On examination he found a silk-bobbin about an inch from the entrance, which the patient had introduced fourteen years before. She had already had attacks of peritonitis and hemorrhage, and a urethro-vaginal fistula was found. The bobbin itself was black. This patient had been married twice, and had been cared for by physicians, but the existence of a body ¾ inch long had never been noticed. Poulet quotes two curious cases:[f] in one a pregnant woman was examined by a doctor who diagnosticated carcinomatous degeneration of the neck of the uterus. Capuron, who was consulted relative to the case, did not believe that the state of the woman's health warranted the diagnosis, and on further examination the growth was found to have been a sponge which had previously been introduced by the woman into the vagina. The other case, reported by Guyon, exemplified another error in diagnosis. The patient was a woman who suffered from continuous vaginal hemorrhage, and had been given extensive treatment without success. Finally, when the woman was in extreme exhaustion, an injection of vinegar-water was ordered, the use of which was followed by the expulsion from the vagina of a live leech of a species very abundant in the country. The hemorrhage immediately ceased and health returned.

There is a record[g] of a woman of twenty-eight who was suddenly surprised by some one entering her chamber at the moment she was introducing

[a] 437, 1882, iii., 83. [b] 771, 1888. [c] 789, March 4, 1848.
[d] 614, 1890. [e] 224, June 28, 1873. [f] 641, 621. [g] 550, xxix., 15.

a cedar pencil into her vagina. With the purpose of covering up her act and dissembling the woman sat down, and the shank of the wood was pushed through the posterior wall of the vagina into the peritoneal cavity. The intestine was, without doubt, pierced in two of its curves, which was demonstrated later by an autopsy. A plastic exudation had evidently agglutinated the intestine at the points of penetration, and prevented an immediate fatal issue. Erichsen practised extraction eight months after the accident, and a pencil 5½ inches long, having a strong fecal odor, was brought out. The patient died the fourth day after the operation, from peritonitis, and an autopsy showed the perforation and agglutination of the two intestinal curvatures. Getchell [a] relates the description of a calculus in the vagina, formed about a hair-pin as a nucleus. It is reported that a country girl came to the Hôtel-Dieu to consult Dupuytren, and stated that several years before she had been violated by some soldiers, who had introduced an unknown foreign body into her vagina, which she never could extract. Dupuytren found this to be a small metallic pot, two inches in diameter, with its concavity toward the uterus. It contained a solid black substance of a most fetid odor.

Foreign bodies are generally introduced **in the uterus** either accidentally in vaginal applications, or for the purpose of producing abortion. Zuhmeister [720] describes a case of a woman who shortly after the first manifestations of pregnancy used a twig of a tree to penetrate the matrix. She thrust it so strongly into the uterus that the wall was perforated, and the twig became planted in the region of the kidneys. Although six inches long and of the volume of a goose feather, this branch remained five months in the pelvis without causing any particular inconvenience, and was finally discharged by the rectum. Brignatelli [b] mentions the case of a woman who, in culpable practices, introduced the stalk of a reed into her uterus. She suffered no inconvenience until the next menstrual epoch which was accompanied by violent pains. She presented the appearance of one in the pains of labor. The matrix had augmented in volume, and the orifice of the uterine cervix was closed, but there was hypertrophy as if in the second or third month of pregnancy. After examination a piece of reed three cm. long was extracted from the uterus, its external face being incrusted with hard calcareous material. Meschede of Schwetz, Germany, mentions death from a hair-pin in the uterine cavity.

NAWAB SALAR JUNG BAHADUR

Crouzit [c] was called to see a young girl who had attempted criminal abortion by a darning-needle. When he arrived a fetus of about three months had already been expelled, and had been wounded by the instrument. It was impossible to remove the needle, and the placenta was not expelled for two days. Eleven days afterward the girl commenced to have pains in the inguinal region, and by the thirty-fifth day an elevation was formed, and the pains increased in violence. On the seventy-ninth day a needle six inches

[a] 547, 1873, iii., 635. [b] 641, 628. [c] 162, 1823, T. iii.

long was expelled from the swelling in the groin, and the patient recovered. Lisfranc extracted from the uterus of a woman who supposed herself to be pregnant at the third month, a fragment of a large gum-elastic sound which during illicit maneuvers had broken off within five cm. of its extremity, and penetrated the organ. Lisfranc found there was not the slightest sign of pregnancy, despite the woman's belief that she was with child.

CHAPTER XIV.

MISCELLANEOUS SURGICAL ANOMALIES.

Marvelous Recoveries from Multiple Injuries.—There are injuries so numerous or so great in extent, and so marvelous in their recovery, that they are worthy of record in a section by themselves. They are found particularly in military surgery. In the Medical and Philosophical Commentaries for 1779[a] is the report of the case of a lieutenant who was wounded through the lungs, liver, and stomach, and in whose armpit lodged a ball. It was said that when the wound in his back was injected, the fluid would immediately be coughed up from his lungs. Food would pass through the wound of the stomach. The man was greatly prostrated, but after eleven months of convalescence he recovered. In the brutal capture of Fort Griswold, Connecticut, in 1781, in which the brave occupants were massacred by the British, Lieutenant Avery had an eye shot out, his skull fractured, the brain-substance scattering on the ground, was stabbed in the side, and left for dead; yet he recovered and lived to narrate the horrors of the day forty years after.

A French invalid-artillery soldier, from his injuries and a peculiar mask he used to hide them, was known as "*L'homme à la tête de cire.*" The Lancet gives his history briefly as follows: During the Franco-Prussian War, he was horribly wounded by the bursting of a Prussian shell. His whole face, including his two eyes, were literally blown away, some scanty remnants of the osseous and muscular systems, and the skull covered with hair being left. His wounds healed, giving him such a hideous and ghastly appearance that he was virtually ostracized from the sight of his fellows. For his relief a dentist by the name of Delalain constructed a mask which included a false palate and a set of false teeth. This apparatus was so perfect that the functions of respiration and mastication were almost completely restored to their former condition, and the man was able to speak distinctly, and even to play the flute. His sense of smell also returned. He wore two false eyes simply to fill up the cavities of the orbits, for the parts representing the eyes were closed. The mask was so well-adapted to what remained of the real face, that it was considered by all one of the finest specimens of the prothetic art that could be devised. This soldier, whose name was Moreau, was living and in perfect health at the time of the report, his bizarre face, without expression, and his sobriquet, as mentioned, making him an object of great

[a] 534, 1779, v., 188.

curiosity. He wore the Cross of Honor, and nothing delighted him more than to talk about the war. To augment his meager pension he sold a pamphlet containing in detail an account of his injuries and a description of the skilfully devised apparatus by which his declining life was made endurable. A somewhat similar case is mentioned on page 585.

A most remarkable case of a soldier suffering numerous and almost incredible injuries and recovering and pursuing his vocation with undampened ardor is that of Jacques Roellinger, Company B, 47th New York Volunteers.[a] He appeared before a pension board in New York, June 29, 1865, with the following history: In 1862 he suffered a sabre-cut across the quadriceps extensor of the left thigh, and a sabre-thrust between the bones of the forearm at the middle third. Soon afterward at Williamsburg, Va., he was shot in the thigh, the ball passing through the middle third external to the femur. At Fort Wagner, 1863, he had a sword-cut, severing the spinal muscles and overlying tissue for a distance of six inches. Subsequently he was captured by guerillas in Missouri and tortured by burning splinters of wood, the cicatrices of which he exhibited; he escaped to Florida, where he was struck by a fragment of an exploding shell, which passed from without inward, behind the hamstring on the right leg, and remained embedded and could be plainly felt. When struck he fell and was fired on by the retiring enemy. A ball entered between the 6th and 7th ribs just beneath the apex of the heart, traversed the lungs and issued at the right 9th rib. He fired his revolver on reception of this shot, and was soon bayonetted by his own comrades by mistake, this wound also penetrating the body. He showed a depressed triangular cicatrix on the margin of the epigastrium. If the scars are at all indicative, the bayonet must have passed through the left lobe of the liver and border of the diaphragm. Finally he was struck by a pistol-ball at the lower angle of the left lower jaw, this bullet issuing on the other side of the neck. As exemplary of the easy manner in which he bore his many injuries during a somewhat protracted convalescence, it may be added that he amused his comrades by blowing jets of water through the apertures on both sides of his neck. Beside the foregoing injuries he received many minor ones, which he did not deem worthy of record or remembrance. The greatest disability he suffered at the time of applying for a pension resulted from an ankylosed knee. Not satisfied with his experience in our war, he stated to the pension examiners that he was on his way to join Garibaldi's army. This case is marvelous when we consider the proximity of several of the wounds to a vital part; the slightest deviation of position would surely have resulted in a fatal issue for this apparently charmed life. The following table shows the man's injuries in the order of their reception:—

(1) Sabre-cut across the quadriceps femoris of right leg, dividing the tendinous and muscular structures.

[a] 538, 1875, 685.

(2) Sabre-thrust between the bones in the middle third of the right forearm.

(3) Shot in the right thigh, the ball passing through the middle third.

(4) A sword-cut across the spinal muscles covering the lower dorsal vertebræ.

(5) Tortured by guerillas in Indian fashion by having burning splinters of wood applied to the surface of his right thorax.

(6) An exploded shell passed through the hamstring muscles of the right thigh and embedded itself in the ligamentous tissues of the internal condyle of the femur.

(7) Shot by a ball between the 6th and 7th ribs of the left side.

(8) Bayonetted through the body, the steel passing through the left lobe of the liver and penetrating the posterior border of the diaphragm.

(9) Pistol-ball shot through the sternocleido muscle of one side of the neck, emerging through the corresponding muscle of the other side of the neck.

(10) Sabre-thrust between the bones of the left forearm.

(11) Pistol-shot through the left pectoralis major and left deltoid muscles.

(12) Deep cut dividing the commissure between the left thumb and forefinger down to the carpal bones.

Somewhat analogous to the foregoing is a case reported in 1834 by McCosh from Calcutta. The patient was a native who had been dreadfully butchered in the Chooar campaign. One of his hands was cut off above the wrist. The remaining stump was nearly amputated by a second blow. A third blow penetrated the shoulder-joint. Beside these and several other slashes, he had a cut across the abdomen extending from the umbilicus to the spine. This cut divided the parietes and severed one of the coats of the colon. The intestines escaped and lay by his side. He was then left on the ground as dead. On arrival at the hospital his wounds were dressed and he speedily convalesced, but the injured colon ruptured and an artificial anus was formed and part of the feces were discharged through the wound. This man was subsequently seen at Midnapore healthy and lusty although his body was bent to one side in consequence of a large cicatrix; a small portion of the feces occasionally passed through the open wound.

There is an account[a] of a private soldier, aged twenty-seven, who suffered a gunshot wound of the skull, causing compound fracture of the cranium, and who also received compound fractures of both bones of the leg. He did not present himself for treatment until ten days later. At this time the head-injury caused him no inconvenience, but it was necessary to amputate the leg and remove the necrosed bones from the cranial wounds; the patient recovered.

Recovery After Injuries by Machinery, with Multiple Fractures, etc.—Persons accidentally caught in some portions of powerful machinery

[a] 597, 1866, 219.

usually suffer several major injuries, any one of which might have been fatal, yet there are marvelous instances of recovery after wounds of this nature. Phares [a] records the case of a boy of nine who, while playing in the saw-gate of a cotton-press, was struck by the lever in revolution, the blow fracturing both bones of the leg about the middle. At the second revolution his shoulder was crushed; the third passed over him, and the fourth, with maximum momentum struck his head, carrying away a large part of the integument, including one eyebrow, portions of the skull, membranes, and brain-substance. A piece of cranial bone was found sticking in the lever, and there were stains of brain on all the 24 posts around the circumference of the hole. Possibly from 1½ to two ounces of cerebral substance were lost. A physician was called, but thinking the case hopeless he declined to offer surgical interference. Undaunted, the father of the injured lad straightened the leg, adjusted the various fractures, and administered calomel and salts. The boy progressively recovered, and in a few weeks his shoulder and legs were well. About this time a loosened fragment of the skull was removed almost the size and shape of a dessertspoon, with the handle attached, leaving a circular opening directly over the eye as large as a Mexican dollar, through which cerebral pulsation was visible. A peculiar feature of this case was that the boy never lost consciousness, and while one of his playmates ran for assistance he got out of the hole himself, and moved to a spot ten feet distant before any help arrived, and even then he declined proffered aid from a man he disliked. This boy stated that he remembered each revolution of the lever and the individual injuries that each inflicted. Three years after his injury he was in every respect well. Fraser [b] mentions an instance of a boy of fifteen who was caught in the crank of a balance-wheel in a shingle-mill, and was taken up insensible. His skull was fractured at the parietal eminence and the pericranium stripped off, leaving a bloody tumor near the base of the fracture about two inches in diameter. The right humerus was fractured at the external condyle; there was a fracture of the coronoid process of the ulna, and a backward dislocation at the elbow. The annular ligament was ruptured, and the radius was separated from the ulna. On the left side there was a fracture of the anatomic neck of the humerus, and a dislocation downward. The boy was trephined, and the comminuted fragments removed; in about six weeks recovery was nearly complete. Gibson [c] reports the history of a girl of eight who was caught by her clothing in a perpendicular shaft in motion, and carried around at a rate of 150 or 200 times a minute until the machinery could be stopped. Although she was found in a state of shock, she was anesthetized, in order that immediate attention could be given to her injuries, which were found to be as follows:—

(1) An oblique fracture of the middle third of the right femur.

[a] Richmond Med. Jour., 1868. [b] 124, 1869. [c] 218, 1881, 61.

(2) A transverse fracture of the middle third of the left femur.

(3) A slightly comminuted transverse fracture of the middle third of the left tibia and fibula.

(4) A transverse fracture of the lower third of the right humerus.

(5) A fracture of the lower third of the right radius.

(6) A partial radiocarpal dislocation.

(7) Considerable injuries of the soft parts at the seats of fracture, and contusions and abrasions all over the body.

During convalescence the little patient suffered an attack of measles, but after careful treatment it was found by the seventy-eighth day that she had recovered without bony deformity, and that there was bony union in all the fractures. There was slight tilting upward in the left femur, in which the fracture had been transverse, but there was no perceptible shortening.

Hulke [a] describes a silver-polisher of thirty-six who, while standing near a machine, had his sleeve caught by a rapidly-turning wheel, which drew him in and whirled him round and round, his legs striking against the ceiling and floor of the room. It was thought the wheel had made 50 revolutions before the machinery was stopped. After his removal it was found that his left humerus was fractured at its lower third, and apparently comminuted. There was no pulse in the wrist in either the radial or ulnar arteries, but there was pulsation in the brachial as low as the ecchymosed swelling. Those parts of the hand and fingers supplied by the median and radial nerves were insensible. The right humerus was broken at the middle, the end of the upper fragment piercing the triceps, and almost protruding through the skin. One or more of the middle ribs on the right side were broken near the angle, and there was a large transverse rent in the quadriceps extensor. Despite this terrible accident the man made a perfect recovery, with the single exception of limitation of flexion in the left elbow-joint.

Dewey [b] details a description of a girl of six who was carried around the upright shaft of a flour mill in which her clothes became entangled. Some part of the body struck the bags or stones with each revolution. She sustained a fracture of the left humerus near the insertion of the deltoid, a fracture of the middle third of the left femur, a compound fracture of the left femur in the upper third, with protrusion of the upper fragment and considerable venous hemorrhage, and fracture of the right tibia and fibula at the upper third. When taken from the shafting the child was in a moribund state, with scarcely perceptible pulse, and all the accompanying symptoms of shock. Her injuries were dressed, the fractures reduced, and starch bandages applied; in about six weeks there was perfect union, the right leg being slightly shortened. Six months later she was playing about, with only a slight halt in her gait.

Miscellaneous Multiple Fractures.—Westmoreland [c] speaks of a man

[a] 767, 1878. [b] 124, 1854. [c] Atlanta Acad. of Med., 1874.

who was pressed between two cars, and sustained a fracture of both collar-bones and of the sternum; in addition, six or eight ribs were fractured, driven into and lacerating the lung. The heart was displaced. In spite of these terrible injuries, the man was rational when picked up, and lived nearly half a day. In comment on this case Battey mentions an instance in which a mill-sawyer was run over by 20 or 30 logs, which produced innumerable fractures of his body, constituting him a surgical curiosity. He afterward completely recovered, and, as a consequence of his miraculous escape, became a soothsayer in his region. West[a] reports a remarkable recovery after a compound fracture of the femur, fracture of the jaw, and of the radius, and possibly injury to the base of the skull, and injury to the spine.

There is on record[b] an account of a woman of forty-three who, by muscular action in lifting a stone, fractured her pubes, external to the spine, on the left side. Not realizing her injury she continued hard work all that day, but fell exhausted on the next. She recovered in about a month, and was able to walk as well as ever.

Vinnedge[c] reports recovery after concussion of the brain and extreme shock, associated with fracture of the left femur, and comminuted fractures of the left tibia and fibula.

Tufnell[d] mentions recovery after compound comminuted fracture of the leg, with simple fracture of both collar-bones, and dislocation of the thumb. Nankivell[e] speaks of a remarkable recovery in an individual who suffered compound comminuted fracture of both legs, and fracture of the skull. It was found necessary to amputate the right thigh and left leg. Erichsen[f] effected recovery by rest alone, in an individual whose ribs and both clavicles were fractured by being squeezed.

Gilman[g] records recovery after injuries consisting of fracture of the frontal bone near the junction with the right parietal; fracture of the right radius and ulna at the middle third and at the wrist; and compound fracture of the left radius and ulna, 1¼ inches above the wrist. Boulting[h] reports a case of an individual who suffered compound fractures of the skull and humerus, together with extensive laceration of the thigh and chest, and yet recovered.

Barwell[i] mentions recovery after amputation of the shoulder-joint, in an individual who had suffered fracture of the base of the skull, fracture of the jaw, and compound fracture of the right humerus. There was high delirium followed by imbecility in this case. Bonnet[j] reports a case of fracture of both thighs, two right ribs, luxation of the clavicle, and accidental club-foot with tenotomy, with good recovery from all the complications. Beach[k] speaks

[a] 476, 1879. [b] 672, Sept. 30, 1868. [c] Toledo Med. and Surg. Jour., 1880.
[d] 312, xlvi., 337. [e] 476, 1873, ii., 264. [f] 476, 1861, ii., 229.
[g] 218, 1881, 275. [h] 548, 1879, i., 702. [i] 548, 1879, ii., 64.
[j] Bull. Soc. de Méd. de Poitiers, 1854, 305. [k] 218, cii., 35.

of an individual who suffered fracture of both thighs, and compound comminuted fracture of the tibia, fibula, and tarsal bones into the ankle-joint, necessitating amputation of the leg. The patient not only survived the operation, but recovered with good union in both thighs. As illustrative of the numerous fractures a person may sustain at one time, the London Medical Gazette[a] mentions an injury to a girl of fourteen, which resulted in 31 fractures.

Remarkable Falls.—In this connection it is of interest to note from how great a height a person may fall without sustaining serious injury. A remarkable fall of a miner down 100 meters of shaft (about 333 feet) without being killed is recorded by M. Reumeaux in the Bulletin de l'Industrie Minérale. Working with his brother in a gallery which issued on the shaft, he forgot the direction in which he was pushing a truck; so it went over, and he after it, falling into some mud with about three inches of water. As stated in Nature, he seems neither to have struck any of the wood debris, nor the sides of the shaft, and he showed no contusions when he was helped out by his brother after about ten minutes. He could not, however, recall any of his impressions during the fall. The velocity on reaching the bottom would be about 140 feet, and time of fall 4.12 seconds; but it is thought he must have taken longer. It appears strange that he should have escaped simple suffocation and loss of consciousness during a time sufficient for the water to have drowned him.

While intoxicated Private Gough of the 42d Royal Highlanders[b] attempted to escape from the castle at Edinburgh. He fell almost perpendicularly 170 feet, fracturing the right frontal sinus, the left clavicle, tibia, and fibula. In five months he had so far recovered as to be put on duty again, and he served as an efficient soldier. There is an account[c] of recovery after a fall of 192 feet, from a cliff in County Antrim, Ireland. Manzini[d] mentions a man who fell from the dome of the Invalides in Paris, without sustaining any serious accident, and there is a record from Madrid[e] of a much higher fall than this without serious consequence. In 1792[f] a bricklayer fell from the fourth story of a high house in Paris, landing with his feet on the dirt and his body on stone. He bled from the nose, and lost consciousness for about forty-five minutes; he was carried to the Hôtel-Dieu where it was found that he had considerable difficulty in breathing; the regions about the external malleoli were contused and swollen, but by the eighth day the patient had recovered. In the recent reparation of the Hotel Raleigh in Washington, D. C., a man fell from the top of the building, which is above the average height, fracturing several ribs and rupturing his lung. He was taken to the Emergency Hospital where he was put to bed, and persistent treatment for shock was pursued; little hope of the man's recovery was

[a] Quoted 124, 1833. [b] 124, 1837. [c] 312, 1850.
[d] 363, 1841. [e] 354, 1846, ii. [f] 302, iv., 248.

entertained. His friends were told of his apparently hopeless condition. There were no external signs of the injury with the exception of the emphysema following rupture of the lung. Respiration was limited and thoracic movement diminished by adhesive straps and a binder; under careful treatment the man recovered.

Kartulus[a] mentions an English boy of eight who, on June 1, 1879, while playing on the terrace in the third story of a house in Alexandria, in attempting to fly a kite in company with an Arab servant, slipped and fell 71 feet to a granite pavement below. He was picked up conscious, but both legs were fractured about the middle. He had so far recovered by the 24th of July that he could hobble about on crutches. On the 15th of November of the same year he was seen by Kartulus racing across the playground with some other boys; as he came in third in the race he had evidently lost little of his agility. Parrott[b] reports the history of a man of fifty, weighing 196 pounds, who fell 110 feet from the steeple of a church. In his descent he broke a scaffold pole in two, and fell through the wooden roof of an engine-house below, breaking several planks and two strong joists, and landing upon some sacks of cement inside the house. When picked up he was unconscious, but regained his senses in a short time, and it was found that his injuries were not serious. The left metacarpal bones were dislocated from the carpal bones, the left tibia was fractured, and there were contusions about the back and hips. Twelve days later he left for home with his leg in plaster. Farber and McCassy[c] report a case in which a man fell 50 feet perpendicularly through an elevator shaft, fracturing the skull. Pieces of bone at the superior angle of the occipital bone were removed, leaving the dura exposed for a space one by four inches. The man was unconscious for four days, but entirely recovered in eighteen days, with only a slightly subnormal hearing as an after-effect of his fall.

For many years there have been persons who have given exhibitions of **high jumps,** either landing in a net or in the water. Some of these hazardous individuals do not hesitate to **dive from enormous heights,** being satisfied to strike head first or to turn a somersault in their descent. Nearly all the noted bridges in this country have had their "divers." The death of Odlum in his attempt to jump from Brooklyn bridge is well known. Since then it has been claimed that the feat has been accomplished without any serious injury. It is reported that on June 20, 1896, a youth of nineteen made a headlong dive from the top of the Eads bridge at St. Louis, Mo., a distance of 125 feet. He is said to have swum 250 feet to a waiting tug, and was taken on board without having been hurt.

Probably the most interesting exhibition of this kind that was ever seen was at the Royal Aquarium, London, in the summer of 1895. A part of the regular nightly performance at this Hall, which is familiar on account of its immens-

[a] 476, 1880, i., 486. [b] 224, 1886, ii., 451. [c] Lancet-Clinic, Feb. 22, 1896.

ity, was the jump of an individual from the rafters of the large arched roof into a tank of water about 15 by 20 feet, and from eight to ten feet deep, sunken in the floor of the hall. Another performer, dressed in his ordinary street clothes, was tied up in a bag and jumped about two-thirds of this height into the same tank, breaking open the bag and undressing himself before coming to the surface. In the same performance a female acrobat made a backward dive from the topmost point of the building into a net stretched about ten feet above the floor. Nearly every large acrobatic entertainment has one of these individuals who seem to experience no difficulty in duplicating their feats night after night.

It is a common belief that people falling from great heights die in the act of descent. An interview with the sailor who fell from the top-gallant of an East Indiaman, a height of 120 feet, into the water, elicited the fact that during the descent in the air, sensation entirely disappeared, but returned in a slight degree when he reached the water, but he was still unable to strike out when rising to the surface. By personal observation this man stated that he believed that if he had struck a hard substance his death would have been painless, as he was sure that he was entirely insensible during the fall.[a]

A writer in the Pall Mall Gazette,[b] in speaking of the accidents which had happened in connection with the Forth Bridge, tells of a man who trusted himself to work at the height of 120 feet above the waters of the Firth, simply grasping a rope. His hands became numb with cold, his grasp relaxed, and he fell backward down into the water, but was brought out alive. In another instance a spanner fell a distance of 300 feet, knocked off a man's cap, and broke its way through a four-inch plank. Again, another spanner fell from a great height, actually tearing off a man's clothes, from his waistcoat to his ankle, but leaving him uninjured. On another occasion a staging with a number of workmen thereon gave way. Two of the men were killed outright by striking some portion of the work in their descent; two others fell clear of the girders, and were rescued from the Firth little worse for their great fall.

Resistance of Children to Injuries.—It is a remarkable fact that young children, whose bones, cartilages, and tissues are remarkably elastic, are sometimes able to sustain the passage over their bodies of vehicles of great weight without apparent injury. There is a record early in this century [c] of a child of five who was run over across the epigastrium by a heavy two-wheeled cart, but recovered without any bad symptoms. The treatment in this case is quite interesting, and was as follows: venesection to faintness, castor oil in infusion of senna until there was a free evacuation of the bowels, 12 leeches to the abdomen and spine, and a saline mixture every two hours! Such depleting therapeutics would in themselves seem almost sufficient to

[a] 476, 1889, ii., 466. [b] Sept., 1888. [c] 476, 1829, 652.

provoke a fatal issue, and were given in good faith as the means of effecting a recovery in such a case. In a similar instance[a] a wagon weighing 1200 pounds passed over a child of five, with no apparent injury other than a bruise near the ear made by the wheel.

Infant-vitality is sometimes quite remarkable, a newly-born child sometimes surviving extreme exposure and major injuries. There was a remarkable instance of this kind brought to light in the Mullings *vs.* Mullings divorce-case, recorded in The Lancet.[b] It appeared that Mrs. Mullings, a few hours after her confinement at Torquay, packed her newly-born infant boy in a portmanteau, and started for London. She had telegraphed Dr. J. S. Tulloch to meet her at Paddington, where he found his patient apparently in good condition, and not weak, as he expected in a woman shortly to be confined. On the way to her apartments, which had been provided by Dr. Tulloch, Mrs. Mullings remarked to the Doctor that she had already borne her child. Dr. Tulloch was greatly surprised, and immediately inquired what she had done with the baby. She replied that it was in a box on top of the cab. When the box was opened the child was found alive. The Lancet comments on the remarkable fact that, shortly after confinement, a woman can travel six or seven hours in a railroad train, and her newly-born babe conveyed the same distance in a portmanteau, without apparent injury, and without attracting attention.

Booth[c] reports a remarkable case of vitality of a newly-born child which came under his observation in October, 1894. An illegitimate child, abandoned by its mother, was left at the bottom of a cesspool vault; she claimed that ten hours before Booth's visit it had been accidentally dropped during an attempt to micturate. The infant lived despite the following facts: Its delivery from an ignorant, inexperienced, unattended negress; its cord not tied; its fall of 12 feet down the pit; its ten hours' exposure in the cesspool; its smothering by foul air, also by a heavy covering of rags, paper, and straw; its pounding by three bricks which fell in directly from eight feet above (some loose bricks were accidentally dislodged from the sides of the vault, in the maneuvers to extricate the infant); its lowered temperature previous to the application of hot bottles, blankets, and the administration of cardiac stimulants. Booth adds that the morning after its discovery the child appeared perfectly well, and some two months afterward was brought into court as evidence in the case. A remarkable case of infant vitality is given on page 117.

Operations in the Young and Old.—It might be of interest to mention that such a major operation as ovariotomy has been successfully performed in an infant. In a paper on infant ovariotomy[d] several instances of this nature are mentioned. Roemer successfully performed ovariotomy on a child one year and eight months old; Swartz, on a child of four; Barker, on

[a] 218, 1847. [b] 476, 1874, ii., 169. [c] 792, Feb., 1895. [d] 224, 1884, i., 234.

a child of four; Knowsley Thornton, on a child of seven, and Spencer Wells, Cupples, and Chenoweth, on children of eight. Rein performed ovariotomy on a girl of six, suffering from a multilocular cyst of the left ovary. He expresses his belief that childhood and infancy are favorable to laparotomy.

Kidd[a] removed a dermoid from a child of two years and eleven months; Hooks[b] performed the same operation on a child of thirty months. Chiene[c] extirpated an ovary from a child of three; Neville[d] duplicated this operation in a child one month younger; and Alcock[e] performed ovariotomy on a child of three.

Successful ovariotomies are infrequent in the extremely aged. Bennett[f] mentions an instance in a woman of seventy-five, and Davies[g] records a similar instance. Borsini[h] and Terrier[i] cite instances of successful ovariotomy in patients of seventy-seven. Carmichael[j] performed the operation at seventy-four. Owens[k] mentions it at eighty; and Homans[l] at eighty-two years and four months. Dewees[m] records a successful case of ovariotomy in a woman over sixty-seven; McNutt[n] reports a successful instance in a patient of sixty-seven years and six months; the tumor weighed 60 pounds, and there were extensive adhesions. Maury removed a monocystic ovarian tumor from a woman of seventy-four, his patient recovering. Pippingsköld mentions an ovariotomy at eighty. Terrier[o] describes double ovariotomy for fibromata in a woman of seventy-seven. Aron[p] speaks of an operation for pilous dermoid of the ovary in a woman of seventy-five. Shepherd[q] reports a case of recurrent proliferous cyst in a woman of sixty-three, on whom successful ovariotomy was performed twice within nine months. Wells[r] mentions an ovarian cyst in a woman of sixty-five, from which 72 pints of fluid were removed.

Hawkins[s] describes the case of a musician, M. Rochard, who at the age of one hundred and seven was successfully operated on for strangulated hernia of upward of thirty hours' duration. The wound healed by first intention, and the man was well in two weeks. Fowler[t] operated successfully for strangulated umbilical hernia on a patient of sixty-eight.

Repeated Operations.—Franzolini[u] speaks of a woman of fifty on whom he performed six celiotomies between June, 1879, and April, 1887. The first operation was for fibrocystic disease of the uterus. Since the last operation the woman had had remarkably good health, and there was every indication that well-merited recovery had been effected. The Ephemerides contains an account of a case in which cystotomy was repeated four times, and there is another record of this operation having been done five times on a man.[v] Instances of repeated Cesarean section are mentioned on page 130.

[a] 610, 1880, 241. [b] 125, 1886, 1022. [c] 318, 1883–84, 1132.
[d] Proc. Dublin Obst. Soc., 1879–80, 16. [e] 476, 1871, ii., 850. [f] 130, 1861.
[g] 223, 1887. [h] 688, 1881. [i] 653, 1888. [j] 590, 1883. [k] 223, 1889. [l] 538, 1888.
[m] 548, 1864, i., 560. [n] West. Lancet, San Francisco, 1879–80, viii., 485.
[o] 653, 1888, vii., 466. [p] 363, xlvi., 1065. [q] 476, 1886, i., 1162. [r] 779, x., 189.
[s] 490, Dec. 9, 1842. [t] 224, 1884, i., 555. [u] 361, 1889. [v] 708, 1718, 1985.

Before leaving this subject, we mention a **marvelous operation performed by Billroth**[a] on a married woman of twenty-nine, after her sixth pregnancy. This noted operator performed, synchronously, double ovariotomy and resections of portions of the bladder and ileum, for a large medullary carcinomatous growth of the ovary, with surrounding involvement. Menstruation returned three months after the operation, and in fifteen months the patient was in good health in every way, with no apparent danger of recurrence of the disease.

Self-performed Surgical Operations.—There have been instances in which surgeons and even laymen have performed considerable operations upon themselves. On the battlefield men have amputated one of their own limbs that had been shattered. In such cases there would be little pain, and premeditation would not be brought into play in the same degree as in the case of M. Clever de Maldigny, a surgeon in the Royal Guards of France, who successfully performed a lithotomy on himself before a mirror. He says that after the operation was completed the urine flowed in abundance; he dressed the wound with lint dipped in an emollient solution, and, being perfectly relieved from pain, fell into a sound sleep. On the following day, M. Maldigny says, he was as tranquil and cheerful as if he had never been a sufferer. A Dutch blacksmith and a German cooper each performed lithotomy on themselves for the intense pain caused by a stone in the bladder. Tulpius,[842] Walther,[815] and the Ephemerides each report an instance of self-performed cystotomy.

The following case is probably the only instance in which the patient, suffering from vesical calculus, tried to crush and break the stone himself.[b] J. B., a retired draper, born in 1828, while a youth of seventeen, sustained a fracture of the leg, rupture of the urethra, and laceration of the perineum, by a fall down a well, landing astride an iron bar. A permanent perineal fistula was established, but the patient was averse to any operative remedial measure. In the year 1852 he became aware of the presence of a calculus, but not until 1872 did he ask for medical assistance. He explained that he had introduced a chisel through his perineal fistula to the stone, and attempted to comminute it himself and thus remove it, and by so doing had removed about an ounce of the calculus. The physician started home for his forceps, but during the interval, while walking about in great pain, the man was relieved by the stone bursting through the perineum, falling to the floor, and breaking in two. Including the ounce already chiselled off, the stone weighed 14½ ounces, and was 10⅝ inches in its long circumference. B. recovered and lived to December, 1883, still believing that he had another piece of stone in his bladder.

In Holden's "Landmarks" we are told that the operation of dividing the Achilles tendon was first performed by an unfortunate upon himself, by means

[a] Wiener Med. Wochenschrift, Nos. ii. and iii., 1883. [b] 381, 1889, i., 408.

of a razor. According to Patterson,[a] the late Mr. Symes told of a patient in North Scotland who, for incipient hip-disease, had the cautery applied at the Edinburgh Infirmary with resultant great relief. After returning home to the country he experienced considerable pain, and despite his vigorous efforts he was unable to induce any of the men to use the cautery upon him; they termed it "barbarous treatment." In desperation and fully believing in the efficacy of this treatment as the best means of permanently alleviating his pain, the crippled Scotchman heated a poker and applied the cautery himself.

We have already mentioned the marvelous instances of Cesarean sections self-performed (page 131), and in the literature of obstetric operations many of the minor type have been done by the patient herself. In the foregoing cases it is to be understood that the operations have been performed solely from the inability to secure surgical assistance or from the incapacity to endure the pain any longer. These operations were not the self-mutilations of maniacs, but were performed by rational persons, driven to desperation by pain.

Possibly the most remarkable **instances of extensive loss of blood,** with recoveries, are to be found in the older records of venesection. The chronicles of excessive bleeding in the olden days are well known to everybody. Perhaps no similar practice was so universally indulged in. Both in sickness and in health, depletion was indicated, and it is no exaggeration to say that about the hospital rooms at times the floors were covered with blood. The reckless way in which venesection was resorted to, led to its disuse, until to-day it has so vanished from medical practice that even its benefits are overlooked, and depletion is brought about in some other manner. Turning to the older writers, we find Burton[b] describing a patient from whom he took 122 ounces of blood in four days. Dover speaks[307] of the removal of 111 and 190 ounces; Galen, of six pounds; and Haen,[395] of 114 ounces. Taylor[c] relates the history of a case of asphyxia in which he produced a successful issue by extracting one gallon of blood from his patient during twelve hours. Lucas[d] speaks of 50 venesections being practised during one pregnancy. Van der Wiel[e] performed venesection 49 times during a single pregnancy. Balmes[f] mentions a case in which 500 venesections were performed in twenty-five years. Laugier[g] mentions 300 venesections in twenty-six months. Osiander speaks of 8000 ounces of blood being taken away in thirty-five years. Pechlin[622] reports 155 venesections in one person in sixteen years, and there is a record of 1020 repeated venesections.[h]

The loss of blood through **spontaneous hemorrhage** is sometimes remarkable. Fabricius Hildanus[i] reports the loss of 27 pounds of blood in a few days; and there is an older record of 40 pounds being lost in four days.[j] Horstius, Fabricius Hildanus, and Schenck, all record instances of death from

[a] 381, 1889, i., 408. [b] American Med. Repository. [c] 476, 1827, 718.
[d] Med. Obs. & Inquiries. [e] Cent. i., obs. 65. [f] 462, T. lxxi., 233. [g] 462, T. xv.
[h] Samml. Med. Wahrnehm, Band 6, 408. [i] 334, cent. vi., obs. 13. [j] 470, 1683.

hemorrhage of the gums. Tulpius[842] speaks of hemoptysis lasting chronically for thirty years, and there is a similar record of forty years' duration in the Ephemerides. Chapman[a] gives several instances of extreme hemorrhage from epistaxis. He remarks that Bartholinus has recorded the loss of 48 pounds of blood from the nose; and Rhodius, 18 pounds in thirty-six hours. The Ephemerides contains an account of epistaxis without cessation for six weeks. Another writer in an old journal[106] speaks of 75 pounds of blood from epistaxis in ten days. Chapman also mentions a case in which, by intestinal hemorrhage, eight gallons of blood were lost in a fortnight, the patient recovering. In another case a pint of blood was lost daily for fourteen days, with recovery. The loss of eight quarts in three days caused death in another case; and Chapman, again, refers to the loss of three gallons of blood from the bowel in twenty-four hours. In the case of Michelotti, recorded in the Transactions of the Royal Society, a young man suffering from enlargement of the spleen vomited 12 pounds of blood in two hours, and recovered.

In hemorrhoidal hemorrhages, Lieutaud speaks of six quarts being lost in two days; Hoffman, of 20 pounds in less than twenty-four hours, and Panaroli, of the loss of one pint daily for two years.

Arrow-Wounds.—According to Otis[b] the illustrious Baron Percy was wont to declare that military surgery had its origin in the treatment of wounds inflicted by darts and arrows; he used to quote Book XI. of the Iliad in behalf of his belief, and to cite the cases of the patients of Chiron and Machaon, Menelaus and Philoctetes, and Eurypiles, treated by Patroclus; he was even tempted to believe with Sextus[c] that the name ἰατρός, medicus, was derived from ἰός, which in the older times signified "sagitta," and that the earliest function of our professional ancestors was the extraction of arrows and darts. An instrument called beluleum was invented during the long Peloponnesian War, over four hundred years before the Christian era. It was a rude extracting-forceps, and was used by Hippocrates in the many campaigns in which he served. His immediate successor, Diocles, invented a complicated instrument for extracting foreign bodies, called graphiscos, which consisted of a canula with hooks. Otis states that it was not until the wars of Augustus that Heras of Cappadocia designed the famous duck-bill forceps which, with every conceivable modification, has continued in use until our time. Celsus[d] instructs that in extracting arrow-heads the entrance-wound should be dilated, the barb of the arrow-head crushed by strong pliers, or protected between the edges of a split reed, and thus withdrawn without laceration of the soft parts. According to the same authority, Paulus Aegineta also treated fully of wounds by arrow-heads, and described a method used in his time to remove firmly-impacted arrows. Albucasius[115] and others of the Arabian school did little or nothing toward aiding our knowledge of the means of

[a] "Eruptive Fevers."
[b] 847, 144.
[c] Advers. Math., L. I., cap. ii.
[d] 259, L. vii., cap. v.

extracting foreign bodies. After the fourteenth century the attention of surgeons was directed to wounds from projectiles impelled by gunpowder. In the sixteenth century arrows were still considerably used in warfare, and we find Paré[a] delineating the treatment of this class of injuries with the sovereign good sense that characterized his writings. As the use of firearms became prevalent the literature of wounds from arrows became meager, and the report of an instance in the present day is very rare.

Bill[b] has collected statistics and thoroughly discussed this subject, remarking upon the rapidity with which American Indians discharge their arrows, and states that it is exceptional to meet with only a single wound. It is commonly believed that the Indian tribes make use of **poisoned arrows,** but from the reports of Bill and others, this must be a very rare custom. Ashhurst states that he was informed by Dr. Schell, who was stationed for some time at Fort Laramie, that it is the universal custom to dip the arrows in blood, which is allowed to dry on them; it is not, therefore, improbable that septic material may thus be inoculated through a wound.

Many savage tribes still make use of the poisonous arrow. The Dyak uses a sumpitan, or blow-tube, which is about seven feet long, and having a bore of about half an inch. Through this he blows his long, thin dart, anointed on the head with some vegetable poison. Braidwood[c] speaks of the physiologic action of Dajaksch, an arrow-poison used in Borneo. Arnott[d] has made observations relative to a substance produced near Aden, which is said to be used by the Somalies to poison their arrows. Messer of the British Navy has made inquiries into the reputed poisonous nature of the arrows of the South Sea Islanders.

Otis[e] has collected reports of arrow-wounds from surgical cases occurring in the U. S. Army. Of the **multiple arrow-wounds,** six out of the seven cases were fatal. In five in which the cranial cavity was wounded, four patients perished. There were two remarkable instances of recovery after penetration of the pleural cavity by arrows. The great fatality of arrow-wounds of the abdomen is well known, and, according to Bill, the Indians always aim at the umbilicus; when fighting Indians, the Mexicans are accustomed to envelop the abdomen, as the most vulnerable part, in many folds of a blanket.

Of the arrow-wounds reported, nine were fatal, with one exception, in which the lesion implicated the soft parts only. The regions injured were the scalp, face, and neck, in three instances; the parietes of the chest in six; the long muscles of the back in two; the abdominal muscles in two; the hip or buttocks in three; the testis in one; the shoulder or arm in 13; forearm or hand in six; the thigh or leg in seven.

The force with which arrows are projected by Indians is so great that it

[a] 618, 445, et seq. [b] 124, xliv., 365 and 439, ii. [c] 318, 1864, x., 123.
[d] 777, 1855, ii., 314. [e] 847, 144.

has been estimated that the initial velocity nearly equals that of a musket-ball. At a short distance an arrow will perforate the larger bones without comminuting them, causing a slight fissure only, and resembling the effect of a pistol-ball fired through a window-glass a few yards off.

Among extraordinary cases of **recovery from arrow-wounds,** several of the most striking will be recorded. Tremaine [a] mentions a sergeant of thirty-four who, in a fray with some hostile Indians, received seven arrow-wounds: two on the anterior surface of the right arm; one in the right axilla; one on the right side of the chest near the axillary border; two on the posterior surface of the left arm near the elbow-joint, and one on the left temple. On June 1st he was admitted to the Post Hospital at Fort Dodge, Kan. The wound on the right arm near the deltoid discharged, and there was slight exfoliation of the humerus. The patient was treated with simple dressings, and was returned to duty in July, 1870.

Goddard [b] mentions an arrow-wound by which the body was transfixed. The patient was a sutler's helper at Fort Rice, Dakota Territory. He was accidentally wounded in February, 1868, by an arrow which entered the back three inches to the right of the 5th lumbar vertebra, and emerged about two inches to the right of the ensiform cartilage. During the following evening the patient lost about eight ounces of blood externally, with a small amount internally. He was confined to his bed some two weeks, suffering from circumscribed peritonitis with irritative fever. In four weeks he was walking about, and by July 1st was actively employed. The arrow was deposited in the Army Medical Museum.

Muller [c] gives a report of an arrow-wound of the lung which was productive of pleurisy but which was followed by recovery. Kugler [d] recites the description of the case of an arrow-wound of the thorax, complicated by frightful dyspnea and blood in the pleural cavity and in the bronchi, with recovery.

Smart [e] extracted a hoop-iron arrow-head, 1¾ inches long and ½ inch in breadth, from the brain of a private, about a month after its entrance. About a dram of pus followed the exit of the arrow-head. After the operation the right side was observed to be paralyzed, and the man could not remember his name. He continued in a varying condition for a month, but died on May 13, 1866, fifty-two days after the injury. At the postmortem it was found that the brain-tissue, to the extent of ¾ inch around the track of the arrow as a center, was softened and disorganized. The track itself was filled with thick pus which extended into the ventricles.

Peabody reports a most remarkable case of recovery from multiple arrow-wounds.[f] In a skirmish with some Indians on June 3, 1863, the patient had been wounded by eight distinct arrows which entered different parts of the body. They were all extracted with the exception of one, which had entered at the outer and lower margin of the right scapula, and had passed inward

[a] 847, 156. [b] 847, 153. [c] 847, 151. [d] Ibid. [e] 847, 147. [f] 847, 145.

and upward through the upper lobe of the right lung or trachea. The hemorrhage at this time was so great that all hope was abandoned. The patient, however, rallied, but continued to experience great pain on swallowing, and occasionally spat blood. In July, 1866, more than three years after the injury, he called on Dr. Peabody to undergo an examination with a view of applying for a pension, stating that his health was affected from the presence of an arrow-head. He was much emaciated, and expressed himself as tired of life. Upon probing through a small fistulous opening just above the superior end of the sternum, the point of the arrow was found resting against the bone, about 1½ inches below, the head lying against the trachea and esophagus, with the carotid artery, jugular vein, and nerves overlying. After some little difficulty the point of the arrow was raised above the sternum, and it was extracted without the loss of an ounce of blood. The edge grazed against the sheath of the innominate artery during the operation. The missile measured an inch at the base, and was four inches long. The health of the patient underwent remarkable improvement immediately after the operation.

NAWAB SALAR JUNG BAHADUR.

Serious Insect-stings.—Although in this country the stings of insects are seldom productive of serious consequences, in the tropic climates death not unfrequently results from them. Wounds inflicted by large spiders, centipedes, tarantulæ, and scorpions have proved fatal. Even in our country deaths, preceded by gangrene, have sometimes followed the bite of a mosquito or a bee, the location of the bite and the idiosyncrasy of the individual probably influencing the fatal issue. In some cases, possibly, some vegetable poison is introduced with the sting. Hulse, U. S. N.,[a] reports the case of a man who was bitten on the penis by a spider, and who subsequently exhibited violent symptoms simulating spinal meningitis, but ultimately recovered. Kunst[b] mentions a man of thirty-six who received several bee-stings while taking some honey from a tree, fell from the tree unconscious, and for some time afterward exhibited signs of cerebral congestion. Chaumeton[c] mentions a young man who did not perceive a wasp in a glass of sweet wine, and swallowed the insect. He was stung in the throat, followed by such intense inflammation that the man died asphyxiated in the presence of his friends, who could do nothing to relieve him. In connection with this case there is mentioned an English agriculturist who saved the life of one of his friends who had inadvertently swallowed a wasp with a glass of beer. Alarming symptoms manifested themselves at the moment of the sting. The farmer made a kind of paste from a solution of common salt in as little water as possible, which he gave to the young man, and, after several swallows of the potion, the symptoms disappeared as if by enchantment. There is a recent account from Bridgeport, Conn., of a woman who, while eating a pear, swallowed a hornet that had alighted on the fruit. In going down the throat the insect

[a] 124, 1839, 69. [b] 545, 1878, 130. [c] 302, i.

stung her on the tonsil. Great pain and inflammation followed, and in a short time there was complete deprivation of the power of speech.

Mease[a] relates the case of a corpulent farmer who, in July, 1835, was stung upon the temple by a common bee. He walked to a fence a short distance away, thence to his house, 20 yards distant, lay down, and expired in ten minutes. A second case, which occurred in June, 1811, is also mentioned by Mease.[b] A vigorous man was stung in the septum of the nose by a bee. Supported by a friend he walked to his house, a few steps distant, and lay down. He rose immediately to go to the well, stepped a few paces, fell, and expired. It was thirty minutes from the time of the accident to the man's death. A third case is reported by the same author from Kentucky. A man of thirty-five was stung on the right superior palpebrum, and died in twenty minutes. Mease reports a fourth case from Connecticut, in which a man of twenty-six was stung by a bee on the tip of the nose. He recovered after treatment with ten-grain doses of Dover's Powder, and persistent application of plantain leaves. A fifth case was that of a farmer in Pennsylvania who was stung in the left side of the throat by a wasp which he had swallowed in drinking cider. Notwithstanding medical treatment, death ensued twenty-seven hours afterward. A sixth case, which occurred in October, 1834, is given by the same author. A middle-aged man was stung by a yellow wasp on the middle finger of the right hand, and died in less than twenty minutes after having received his wound. A seventh case was that of a New York farmer who, while hoeing, was bitten on the foot by a spider. Notwithstanding medical treatment, principally bleeding, the man soon expired.

Desbrest[c] mentions the sting of a bee above the eyebrow followed by death. Zacutus saw a bee-sting which was followed by gangrene. Delaistre[d] mentions death from a hornet-sting in the palate. Nivison[e] relates the case of a farmer of fifty who was stung in the neck by a bee. The usual swelling and discoloration did not follow, but notwithstanding vigorous medical treatment the man died in six days. Thompson[f] relates three cases of bee-sting, in all of which death supervened within fifteen minutes,—one in a farmer of fifty-eight who was stung in the neck below the right ear; a second in an inn-keeper of fifty who was stung in the neck, and a third of a woman of sixty-four who was stung on the left brow. "Chirurgus"[g] recalls the details of a case of a wasp-sting in the middle finger of the right hand of a man of forty, depriving him of all sense and of muscular power. Ten minutes after receiving it he was unconscious, his heart-beats were feeble, and his pulse only perceptible.

Syphilis from a Flea-bite.—Jonathan Hutchinson, in the October, 1895, number of his unique and valuable Archives of Surgery, reports a primary lesion of most unusual origin. An elderly member of the profession presented himself entirely covered with an evident syphilitic eruption, which

[a] 124, 1836–37, xix., 265. [b] Ibid. [c] 462, 1765. [d] Gaz. de Santé, 1776.
[e] 594, 1857, 3 s., ii., 339. [f] 224, 1869, i., 374. [g] 535, 1819, xl., 479.

rapidly disappeared under the use of mercury. The only interest about the case was the question as to how the disease had been acquired. The doctor was evidently anxious to give all the information in his power, but was positive that he had never been exposed to any sexual risk, and as he had retired from practice, no possibility of infection in that manner existed. He willingly stripped, and a careful examination of his entire body surface revealed no trace of lesion whatever on the genitals, or at any point, except a dusky spot on one leg, which looked like the remains of a boil. This, the doctor stated, had been due to a small sore, the dates of the appearance and duration of which were found to fit exactly with those of a primary lesion. There had also been some enlargement of the femoral glands. He had never thought of the sore in this connection, but remembered most distinctly that it followed a flea-bite in an omnibus, and had been caused, as he supposed, by his scratching the place, though he could not understand why it lasted so long. Mr. Hutchinson concludes that all the evidence tends to show that the disease had probably been communicated from the blood of an infected person through the bite of the insect. It thus appears that even the proverbially trivial flea-bite may at times prove a serious injury.

Snake-bites.—A writer in an Indian paper asserts that the traditional **immunity of Indian snake-charmers** is due to the fact that having been accidentally bitten by poisonous serpents or insects more than once, and having survived the first attack, they are subsequently immune. His assertion is based on personal acquaintance with Madari Yogis and Fakirs, and an actual experiment made with a Mohammedan Fakir who was immune to the bites of scorpions provided by the writer. The animals were from five to seven inches long and had lobster-like claws. Each bite drew blood, but the Fakir was none the worse.

The venom of poisonous snakes may be considered the most typical of animal poisons, being unrivaled in the fatality and rapidity of its action. Fortunately in our country there are few snake-bites, but in the tropic countries, particularly India, the mortality from this cause is frightful. Not only are there numerous serpents in that country, but the natives are lightly dressed and unshod, thus being exposed to the bites of the reptiles. It is estimated by capable authorities that the deaths in India each year from snake-bites exceed 20,000. It is stated that there were 2893 human beings killed by tigers, leopards, hyenas, and panthers in India during the year 1894, and in the same year the same species of beasts, aided by snakes, killed 97,371 head of cattle. The number of human lives destroyed by snakes in India in 1894 was 21,538. The number of wild beasts killed in the same year was 13,447, and the number of snakes killed was 102,210.

Yarrow of Washington, who has been a close student of this subject, has found in this country no less than 27 species of poisonous snakes, belonging to four genera. The first genus is the Crotalus, or rattlesnake proper; the second

is the Caudisona, or ground-rattlesnake; the third is the Ancistrodon, or moccasin, one of the species of which is a water-snake; and the fourth is the Elaps, or harlequin snake. There is some dispute over the exact degree of the toxic qualities of the venom of the Heloderma suspectum, or Gila monster. In India the cobra is the most deadly snake. It grows to the length of 5½ feet, and is most active at night. The Ophiophagus, or hooded cobra, is one of the largest of venomous snakes, sometimes attaining a length of 15 feet; it is both powerful, active, and aggressive. The common snakes of the deadly variety in the United States are the rattlesnake, the "copperhead," and the moccasin; and it is from the bites of one of these varieties that the great majority of reported deaths are caused. But in looking over medical literature one is struck with the scarcity of reports of fatal snake-bites. This is most likely attributable to the fact that, except a few army-surgeons, physicians rarely see the cases. The natural abode of the serpents is in the wild and uninhabited regions.

The venom is delivered to the victim through the medium of a long fang which is connected with a gland in which the poison is stored. The supply may be readily exhausted; for a time the bite would then be harmless. Contrary to the general impression, snake-venom when swallowed is a deadly poison, as proved by the experiments of Fayrer, Mitchell, and Reichert. Death is most likely caused by paralysis of the vital centers through the circulation. In this country the wounds invariably are on the extremities, while in India the cobra sometimes strikes on the shoulder or neck.

If called on to describe accurately the **symptoms of snake-venom poisoning,** few medical men could respond correctly. In most cases the wound is painful, sometimes exaggerated by the mental condition, which is wrought up to a pitch rarely seen in other equally fatal injuries. It is often difficult to discern the exact point of puncture, so minute is it. There is swelling due to effusion of blood, active inflammation, and increasing pain. If the poison has gained full entrance into the system, in a short time the swelling extends, vesicles soon form, and the disorganization of the tissues is so rapid that gangrene is liable to intervene before the fatal issue. The patient becomes prostrated immediately after the infliction of the wound, and his condition strongly indicates the use of stimulants, even if the medical attendant were unfamiliar with the history of the snake-bite. There may be a slight delirium; the expression becomes anxious, the pulse rapid and feeble, the respiration labored, and the patient complains of a sense of suffocation. Coma follows, and the respirations become slower and slower until death results. If the patient lives long enough, the discoloration of the extremity and the swelling may spread to the neck, chest and back. Loss of speech after snake-bite is discussed in Chapter XVII., under the head of Aphasia.

A peculiar complication is a distressing inflammation of the mouth of individuals that have sucked the wounds containing venom. This custom is

still quite common, and is preferred by the laity to the surer and much wiser method of immediate cauterization by fire. There is a curious case reported [a] of a young man who was bitten on the ankle by a viper; he had not sucked the wound, but he presented such an enormous swelling of the tongue as to be almost provocative of a fatal issue. In this case the lingual swelling was a local effect of the general constitutional disturbance.

Cases of Snake-bite.—The following case illustrative of the tenacity of virulence of snake-venom was reported by Mr. Temple, Chief Justice of Honduras, and quoted by a London authority.[b] While working at some wood-cutting a man was struck on a heavy boot by a snake, which he killed with an axe. He imagined that he had been efficiently protected by the boot, and he thought little of the incident. Shortly afterward he began to feel ill, sank into a stupor, and succumbed. His boots were sold after his death, as they were quite well made and a luxury in that country. In a few hours the purchaser of the boots was a corpse, and every one attributed his death to apoplexy or some similar cause. The boots were again sold, and the next unfortunate owner died in an equally short time. It was then thought wise to examine the boots, and in one of them was found, firmly embedded, the fang of the serpent. It was supposed that in pulling on the boots each of the subsequent owners had scratched himself and became fatally inoculated with the venom, which was unsuspected and not combated. The case is so strange as to appear hypothetic, but the authority seems reliable.

The following are three cases of snake-bite reported by surgeons of the United States Army, two followed by recovery, and the other by death: Middleton [c] mentions a private in the Fourth Cavalry, aged twenty-nine, who was bitten by a rattlesnake at Fort Concho, Texas, June 27, 1866. The bite opened the phalangeal joint of the left thumb, causing violent inflammation, and resulted in the destruction of the joint. Three years afterward the joint swelled and became extremely painful, and it was necessary to amputate the thumb. Campbell [d] reports the case of a private of the Thirteenth Infantry who was bitten in the throat by a large rattlesnake. The wound was immediately sucked by a comrade, and the man reported at the Post Hospital, at Camp Cooke, Montana, three hours after the accident. The only noticeable appearance was a slightly wild look about the eyes, although the man did not seem to be the least alarmed. The region of the wound was hard and somewhat painful, probably from having been bruised by the teeth of the man who sucked the wound; it remained so for about three hours. The throat was bound up in rancid olive oil (the only kind at hand) and no internal remedy was administered. There were no other bad consequences, and the patient soon returned to duty.

Le Carpentier [e] sends the report of a fatal case of rattlesnake-bite: A pri-

[a] Repert. di Medicina, Torino, 1828.
[b] 548, 1856, ii., 597.
[c] 847, 164.
[d] Ibid.
[e] Ibid.

vate, aged thirty-seven, remarkable for the singularity of his conduct, was known in his Company as a snake-charmer, as he had many times, without injury, handled poisonous snakes. On the morning of July 13, 1869, he was detailed as guard with the herd at Fort Cummings, New Mexico, when, in the presence of the herders, he succeeded in catching a rattlesnake and proving his power as a sorcerer. The performance being over and the snake killed, he caught sight of another of the same class, and tried to duplicate his previous feat; but his dexterity failed, and he was bitten in the middle finger of the right hand. He was immediately admitted to the Post Hospital, complaining only of a little pain, such as might follow the sting of a bee or wasp. A ligature was applied above the wound; the two injuries made by the fangs were enlarged by a bistoury; ammonia and the actual cautery were applied; large doses of whiskey were repeated frequently, the constitution of the patient being broken and poor. Vomiting soon came on but was stopped without trouble, and there were doubts from the beginning as to his recovery. The swelling of the hand and arm gradually increased, showing the particular livid and yellowish tint following the bites of poisonous snakes. A blister was applied to the bitten finger, tincture of iodin used, and two ounces of whiskey given every two hours until inebriety was induced. The pulse, which was very much reduced at first, gained gradually under the influence of stimulants; two grains of opium were given at night, the patient slept well, and on the next day complained only of numbness in the arm. The swelling had extended as far as the shoulder-joint, and the blood, which was very fluid, was incessantly running from the wound. Carbolic acid and cerate were applied to the arm, with stimulants internally. On the 15th his condition was good, the swelling had somewhat augmented, there was not so much lividity, but the yellowish hue had increased. On the 16th the man complained of pain in the neck, on the side of the affected limb, but his general condition was good. Examining his genitals, an iron ring ¾ inch in diameter was discovered, imbedded in the soft tissues of the penis, constricting it to such a degree as to have produced enormous enlargement of the parts. Upon inquiry it seemed that the ring had been kept on the parts very long, as a means of preservation of chastity; but under the influence of the snake's venom the swelling had increased, and the patient having much trouble in passing water was obliged to complain. The ring was filed off with some difficulty. Gangrene destroyed the extremity of the bitten finger. From this date until the 30th the man's condition improved somewhat. The progress of the gangrene was stopped, and the injured finger was disarticulated at the metacarpal articulation. Anesthesia was readily obtained, but the appearance of the second stage was hardly perceptible. Le Carpentier was called early on the next morning, the patient having been observed to be sinking; there was stertorous respiration, the pulse was weak and slow, and the man was only partly conscious. Electricity was applied to the

spine, and brandy and potassium bromid were given, but death occurred about noon. A necropsy was made one hour after death. There was general softening of the tissues, particularly on the affected side. The blood was black and very fluid,—not coagulable. The ventricles of the brain were filled with a large amount of serum; the brain was somewhat congested. The lungs were healthy, with the exception of a few crude tubercles of recent formation on the left side. The right ventricle of the heart was empty, and the left filled with dark blood, which had coagulated. The liver and kidneys were healthy, and the gall-bladder very much distended with bile. The intestines presented a few livid patches on the outside.

Hydrophobia.—The bite of an enraged animal is always of great danger to man, and death has followed a wound inflicted by domestic animals or even fowls; a human bite has also caused a fatal issue. **Rabies** is frequently observed in herbivorous animals, such as the ox, cow, or sheep, but is most commonly found in the carnivora, such as the dog, wolf, fox, jackal, hyena, and cat and other members of the feline tribe. Fox [a] reports several cases of death from symptoms resembling those of hydrophobia in persons who were bitten by skunks. Swine, birds, and even domestic poultry have caused hydrophobia by their bites. Le Cat [b] speaks of the bite of an enraged duck causing death, and Thiermeyer mentions death shortly following the bite of a goose, as well as death in three days from a chicken-bite. Camerarius [c] describes a case of epilepsy which he attributed to a horse-bite. Among the older writers speaking of death following the bite of an enraged man, are van Meek'ren,[560] Wolff,[d] Zacutus Lusitanus,[831] and Glandorp.[380] The Ephemerides contains an account of hydrophobia caused by a human bite. Jones [e] reports a case of syphilitic inoculation from a human bite on the hand.

Hydrophobia may not necessarily be from a bite; a previously-existing wound may be inoculated by the saliva alone, conveyed by licking. Pliny, and some subsequent writers, attributed rabies to a worm under the animal's tongue which they called "lytta." There is said to be a superstition in India that, shortly after being bitten by a mad dog, the victim conceives pups in his belly; at about three months these move rapidly up and down the patient's intestines, and being mad like their progenitor, they bite and bark incessantly, until they finally kill the unfortunate victim. The natives of Nepaul firmly believe this theory.[f] All sorts of curious remedies have been suggested for the cure of hydrophobia. Crabs-claws, Spanish fly, and dragon roots, given three mornings before the new or full moon, was suggested as a specific by Sir Robert Gordon. Theodore De Vaux remarks that the person bitten should immediately pluck the feathers from the breech of an old cock and apply them bare to the bites. If the dog was mad the cock was supposed to swell and die. If the dog was not mad the cock would not swell;

[a] 481, 1872, vi., 119. [b] 462, T. ii., 90. [c] Diss. de Epilep., 15.
[d] Observ. de Med. Chirurg., ii., No. 5. [e] 224, 1872, i., 313. [f] 433, 1834, i., 202.

in either case the person so treated was immune. Mad-stones, as well as snake-stones, are believed in by some persons at the present day. According to Curran,[a] at one time in Ireland the fear of hydrophobia was so great that any person supposed to be suffering from it could be legally smothered.

According to French statistics, hydrophobia is an extremely fatal disease, although the proportion of people bitten and escaping without infection is overwhelmingly greater than those who acquire the disease. The mortality of genuine hydrophobia is from 30 to 80 per cent., influenced by efficient and early cauterization and scientific treatment. There is little doubt that many of the cases reported as hydrophobia are merely examples of general systemic infection from a local focus of sepsis, made possible by some primitive and uncleanly treatment of the original wound. There is much superstition relative to hydrophobia; the majority of wounds seen are filled with the hair of the dog, soot, ham-fat, and also with particles of decayed food and saliva from the mouth of some person who has practised sucking the wound.

Ordinarily, the **period of incubation of hydrophobia** in man is before the end of the second month, although rarely cases are seen as many as six months from the reception of the bite. The first **symptoms** of the disease are melancholia, insomnia, loss of appetite, and occasionally shooting pains, radiating from the wound. There may be severe pain at the back of the head and in the neck. Difficulty in swallowing soon becomes a marked symptom. The speech assumes a sobbing tone, and occasionally the expression of the face is wild and haggard. As regards the crucial diagnostic test of a glass of water, the following account of a patient's attempt to drink is given by Curtis and quoted by Warren:[843] "A glass of water was offered the patient, which he refused to take, saying that he could not stand so much as that, but would take it from a teaspoon. On taking the water from the spoon he evinced some discomfort and agitation, but continued to raise the spoon. As it came within a foot of his lips, he gagged and began to gasp violently, his features worked, and his head shook. He finally almost tossed the water into his mouth, losing the greater part of it, and staggered about the room gasping and groaning. At this moment the respirations seemed wholly costal, and were performed with great effort, the elbows being jerked upward with every inspiration. The paroxysm lasted about half a minute. The act of swallowing did not appear to cause distress, for he could go through the motions of deglutition without any trouble. The approach of liquid toward the mouth would, however, cause distress." It is to be remarked that the spasm affects the mechanism of the respiratory apparatus, the muscles of mastication and deglutition being only secondarily contracted.

Pasteur discovered that the virulence of the virus of rabies could be attenuated in passing it through different species of animals, and also that inoculation of this attenuated virus had a decided prophylactic effect on the

[a] 536, 1879, xxviii., 576.

disease ; hence, by cutting the spinal cord of inoculated animals into fragments a few centimeters long, and drying them, an emulsion could be made containing the virus. The patients are first inoculated with a cord fourteen days old, and the inoculation is repeated for nine days, each time with a cord one day fresher. The intensive method consists in omitting the weakest cords and giving the inoculations at shorter intervals. As a curious coincidence, Pliny and Pasteur, the ancient and modern, both discuss the particular virulence of saliva during fasting.

There is much discussion over the extent of injury a **shark-bite** can produce. In fact some persons deny the reliability of any of the so-called cases of shark-bites. Ensor[a] reports an interesting case occurring at Port Elizabeth, South Africa. While bathing, an expert swimmer felt a sharp pain in the thigh, and before he could cry out, felt a horrid crunch and was dragged below the surface of the water. He struggled for a minute, was twisted about, shaken, and then set free, and by a supreme effort, reached the landing stairs of the jetty, where, to his surprise, he found that a monstrous shark had bitten his leg off. The leg had been seized obliquely, and the teeth had gone across the joints, wounding the condyles of the femur. There were three marks on the left side showing where the fish had first caught him. The amputation was completed at once, and the man recovered. Macgrigor[b] reports the case of a man at a fishery, near Manaar, who was bitten by a shark. The upper jaw of the animal was fixed in the left side of the belly, forming a semicircular wound of which a point one inch to the left of the umbilicus was the upper boundary, and the lower part of the upper third of the thigh, the lower boundary. The abdominal and lumbar muscles were divided and turned up, exposing the colon in its passage across the belly. Several convolutions of the small intestines were also laid bare, as were also the three lowest ribs. The gluteal muscles were lacerated and torn, the tendons about the trochanter divided, laying the bone bare, and the vastus externus and part of the rectus of the thigh were cut across. The wound was 19 inches in length and four or five inches in breadth. When Dr. Kennedy first saw the patient he had been carried in a boat and then in a palanquin for over five miles, and at this time, three hours after the reception of the wound, Kennedy freed the abdominal cavity of salt water and blood, thoroughly cleansed the wound of the hair and the clots, and closed it with adhesive strips. By the sixteenth day the abdominal wound had perfectly closed, the lacerations granulated healthily, and the man did well. Boyle[c] reports recovery from extensive lacerated wounds from the bite of a shark. Both arms were amputated as a consequence of the injuries. Fayrer[d] mentions shark-bites in the Hooghley.

Leprosy from a Fish-bite.—Ashmead[e] records the curious case of a

[a] 476, 1883, i., 1160. [b] 550, ix. [c] 490, 1828-29, iii., 502.
[d] 548, 1871, i., 5. [e] 450, March 16, 1895.

man that had lived many years in a leprous country, and while dressing a fish had received a wound of the thumb from the fin of the fish. Swelling of the arm followed, and soon after bullæ upon the chest, head, and face. In a few months the blotches left from this eruption became leprous tubercles, and other well-marked signs of the malady followed. The author asked if in this case we have to do with a latent leprosy which was evoked by the wound, or if it were a case of inoculation from the fish?

Cutliffe[a] records recovery after amputation at the elbow-joint, as a consequence of an **alligator-bite** nine days before admission to the hospital. The patient exhibited a compound comminuted fracture of the right radius and ulna in their lower thirds, compound comminuted fractures of the bones of the carpus and metacarpus, with great laceration of the soft parts, laying bare the wrist-joint, besides several penetrating wounds of the arm and fore-arm. Mourray[b] gives some notes on a case of **crocodile-bite** with removal of a large portion of omentum. Sircar speaks of recovery from a crocodile-bite. Dudgeon[c] reports two cases of **animal-bites,** both fatal, one **by a bear,** and the other by a **camel.** There is mention[d] of a compound dislocation of the wrist-joint from a horse-bite. Fayrer[e] speaks of a **wolf-bite** of the fore-arm, followed by necrosis and hemorrhage, necessitating ligature of the brachial artery and subsequent excision of the elbow-joint.

Injuries from Lightning.—The subject of lightning-stroke, with its diverse range of injuries, is of considerable interest, and, though not uncommon, the matter is surrounded by a veil of superstition and mystery. It is well known that instantaneous or temporary unconsciousness may result from lightning-stroke. Sometimes superficial or deep burns may be the sole result, and again paralysis of the general nerves, such as those of sensation and motion, may be occasioned. For many years the therapeutic effect of a lightning-stroke has been believed to be a possibility, and numerous instances are on record. The object of this article will be to record a sufficient number of cases of lightning-stroke to enable the reader to judge of its various effects, and form his own opinion of the good or evil of the injury. It must be mentioned here that half a century ago Le Conte[f] wrote a most extensive article on this subject, which, to the present time, has hardly been improved upon.

The first cases to be recorded are those in which there has been complete and rapid **recovery from lightning-stroke.** Crawford[g] mentions a woman who, while sitting in front of her fireplace on the first floor of a two-story frame building, heard a crash about her, and realized that the house had been struck by lightning. The lightning had torn all the weather-boarding off the house, and had also followed a spouting which terminated in a wooden trough

[a] 435, 1870, v., 36.
[b] 435, 1877, xii., 245.
[c] Customs Gaz. Med. Rep., Shanghai, 1874, iv., 12.
[d] 548, xv., 351.
[e] 548, 1869, i., 5.
[f] 594, 1844, iii.
[g] 579, 1870, 12.

in a pig-sty, ten feet back of the house, and killed a pig. Another branch of the fluid passed through the inside of the building and, running along the upper floor to directly over where Mrs. F. was sitting, passed through the floor and descended upon the top of her left shoulder. Her left arm was lying across her abdomen at the time, the points of the fingers resting on the crests of the ilium. There was a rent in the dress at the top of the shoulder, and a red line half an inch wide running from thence along the inside of the arm and fore-arm. In some places there was complete vesication, and on its palmar surface the hand lying on the abdomen was completely denuded. The abdomen, for a space of four inches in length and eight inches in breadth, was also blistered. The fluid then passed from the fingers to the crest of the ilium, and down the outside of the leg, bursting open the shoes, and passing then through the floor. Again a red line half an inch wide could be traced from the ilium to the toes. The clothing was not scorched, but only slightly rent at the point of the shoulder and where the fingers rested. This woman was neither knocked off her chair nor stunned, and she felt no shock at the time. After ordinary treatment for her burns she made rapid and complete recovery.

Halton[a] reports the history of a case of a woman of sixty-five who, about thirty-five minutes before he saw her, had been struck by lightning. While she was sitting in an outbuilding a stroke of lightning struck and shattered a tree about a foot distant. Then, leaving the tree about seven feet from the ground, it penetrated the wall of the building, which was of unplastered frame, and struck Mrs. P. on the back of the head, at a point where her hair was done up in a knot and fastened by two ordinary hair-pins. The hair was much scorched, and under the knot the skin of the scalp was severely burned. The fluid crossed, burning her right ear, in which was a gold ear-ring, and then passed over her throat and down the left sternum, leaving a burn three inches wide, covered by a blister. There was another burn, 12 inches long and three inches wide, passing from just above the crest of the ilium forward and downward to the symphysis pubis. The next burn began at the patella of the right knee, extending to the bottom of the heel, upon reaching which it wound around the inner side of the leg. About four inches below the knee a sound strip of cuticle, about 1½ inches, was left intact. The lightning passed off the heel of the foot, bursting open the heel of a strongly sewed gaiter-boot. The woman was rendered unconscious but subsequently recovered.

A remarkable feature of a lightning-stroke is the fact that it very often strips the affected part of its raiment, as in the previous case in which the shoe was burst open. In a discussion before the Clinical Society of London, October 24, 1879,[b] there were several instances mentioned in which clothes had been stripped off by lightning. In one case mentioned by Sir James Paget, the clothes

[a] 124, 1869. [b] 476, 1879, ii., 656.

were wet and the man's skin was reeking with perspiration. In its course the lightning traveled down the clothes, tearing them posteriorly, and completely stripping the patient. The boots were split up behind and the laces torn out. This patient, however, made a good recovery. Beatson[a] mentions an instance in which an explosion of a shell completely tore off the left leg of a sergeant instructor, midway between the knee and ankle. It was found that the foot and lower third of the leg had been completely denuded of a boot and woolen stocking, without any apparent abrasion or injury to the skin. The stocking was found in the battery and the boot struck a person some distance off. The stocking was much torn, and the boot had the heel missing, and in one part the sole was separated from the upper. The laces in the upper holes were broken but were still present in the lower holes. The explanation offered in this case is similar to that in analogous cases of lightning-stroke, that is, that the gas generated by the explosion found its way between the limb and the stocking and boot and stripped them off.

There is a curious collection of relics, consisting of the clothes of a man struck by lightning, artistically hung in a glass case in the Museum of the Royal College of Surgeons, London, and the history of the injury, of which these remnants are the result, is given by Professor Stewart, the curator, as follows: At half past four on June 8, 1878, James Orman and others were at work near Snave, in Romney Marsh, about eight miles from Ashford. The men were engaged in lopping willows, when the violence of the rain compelled them to take refuge under a hedge. Three of the men entered a shed near by, but Orman remained by the willow, close to the window of the shed. Scarcely were the three inside when a lightning-stroke entered the door, crossed the shed, and passed out the window, which it blew before it into the field. The men noticed that the tree under which Orman stood was stripped of its bark. Their companion's boots stood close to the foot of the tree, while the man himself lay almost perfectly naked a few yards further on, calling for help. When they left him a few moments previously, he was completely clad in a cotton shirt, cotton jacket, flannel vest, and cotton trousers, secured at the waist with leather straps and buckles. Orman also wore a pair of stout hobnail boots, and had a watch and chain. After the lightning-stroke, however, all he had on him was the left arm of his flannel vest. The field was strewn for some distance with fragments of the unfortunate man's clothing. Orman was thrown down, his eyebrows burned off, and his whiskers and beard much scorched. His chest was covered with superficial burns, and he had sustained a fracture of the leg. His strong boots were torn from his feet, and his watch had a hole burned right through it, as if a soldering iron had been used. The watch-chain was almost completely destroyed, only a few links remaining. Together with some fused coins, these were found close by, and are deposited in a closed box in the Museum. According to Orman's account

[a] 224, 1890, i., 514.

of the affair, he first felt a violent blow on the chest and shoulders, and then he was involved in a blinding light and hurled into the air. He said he never lost consciousness; but when at the hospital he seemed very deaf and stupid. He was discharged perfectly cured twenty weeks after the occurrence. The scientific explanation of this amazing escape from this most eccentric vagary of the electric fluid is given,—the fact that the wet condition of the man's clothing increased its power of conduction, and in this way saved his life. It is said that the electric current passed down the side of Orman's body, causing everywhere a sudden production of steam, which by its expansion tore the clothing off and hurled it away. It is a curious fact that where the flannel covered the man's skin the burns were merely superficial, whereas in those parts touched by the cotton trousers they were very much deeper. This case is also quoted and described by Dr. Wilks.[439]

There was a curious case of lightning-stroke reported at Cole Harbor, Halifax. A diver, while at work far under the surface of the water, was seriously injured by the transmission of a lightning-stroke, which first struck the communicating air pump to which the diver was attached. The man was brought to the surface insensible, but he afterward recovered.

Permanent Effect of Lightning on the Nervous System.—MacDonald[a] mentions a woman of seventy-eight who, some forty-two years previous, while ironing a cap with an Italian iron, was stunned by an extremely vivid flash of lightning and fell back unconscious into a chair. On regaining consciousness she found that the cap which she had left on the table, remote from the iron, was reduced to cinders. Her clothes were not burned nor were there any marks on the skin. After the stroke she felt a creeping sensation and numbness, particularly in the arm which was next to the table. She stated positively that in consequence of this feeling she could predict with the greatest certainty when the atmosphere was highly charged with electricity, as the numbness increased on these occasions. The woman averred that shortly before or during a thunder storm she always became nauseated. MacDonald offers as a physiologic explanation of this case that probably the impression produced forty-two years before implicated the right brachial plexus and the afferent branches of the pneumogastric, and to some degree the vomiting center in the medulla; hence, when the atmosphere was highly charged with electricity the structures affected became more readily impressed. Camby[b] relates the case of a neuropathic woman of thirty-eight, two of whose children were killed by lightning in her presence. She herself was unconscious for four days, and when she recovered consciousness, she was found to be hemiplegic and hemianesthetic on the left side. She fully recovered in three weeks. Two years later, during a thunder storm, when there was no evidence of a lightning-stroke, she had a second attack, and three years later a third attack under similar circumstances.

[a] 655, 1886, 348. [b] Soc. Méd. des Hôp., Paris, May 25, 1894.

There are some **ocular injuries from lightning** on record. In these cases the lesions have consisted of detachment of the retina, optic atrophy, cataract, hemorrhages into the retina, and rupture of the choroid, paralysis of the oculomotor muscles, and paralysis of the optic nerve. According to Buller of Montreal, such injuries may arise from the mechanic violence sustained by the patient rather than by the thermal or chemic action of the current. Buller describes a case of lightning-stroke in which the external ocular muscles, the crystalline lens, and the optic nerve were involved. Godfrey [a] reports the case of Daniel Brown, a seaman on H. M. S. Cambrian. While at sea on February 21, 1799, he was struck both dumb and blind by a lightning-stroke. There was evidently paralysis of the optic nerve and of the oculomotor muscles; and the muscles of the glottis were also in some manner deprived of motion.

That an **amputation** can be perfectly performed **by a lightning-stroke** is exemplified in the case of Sycyanko of Cracow, Poland.[b] The patient was a boy of twelve, whose right knee was ankylosed. While riding in a field in a violent storm, a loud peal of thunder caused the horse to run away, and the child fell stunned to the ground. On coming to his senses the boy found that his right leg was missing, the parts having been divided at the upper end of the tibia. The wound was perfectly round and the patella and femur were intact. There were other signs of burns about the body, but the boy recovered. Some days after the injury the missing leg was found near the place where he was first thrown from the horse.

The therapeutic effect of lightning-stroke is verified by a number of cases, a few of which will be given. Tilesius [367] mentions a peculiar case which was extensively quoted in London.[c] Two brothers, one of whom was deaf, were struck by lightning. It was found that the inner part of the right ear near the tragus and anti-helix of one of the individuals was scratched, and on the following day his hearing returned. Olmstead [d] quotes the history of a man in Carteret County, N. C., who was seized with a paralytic affection of the face and eyes, and was quite unable to close his lids. While in his bedroom, he was struck senseless by lightning, and did not recover until the next day, when it was found that the paralysis had disappeared, and during the fourteen years which he afterward lived his affection never returned. There is a record of a young collier [e] in the north of England who lost his sight by an explosion of gunpowder, utterly destroying the right eye and fracturing the frontal bone. The vision of the left eye was lost without any serious damage to the organ, and this was attributed to shock. On returning from Ettingshall in a severe thunder storm, he remarked to his brother that he had seen light through his spectacles, and had immediately afterward experienced a piercing sensation which

[a] 535, 1822, 369. [b] 548, 1869, i., 363. [c] 550, 1825.
[d] 594, 1844, 308. [e] 476, 1888, ii., 178.

had passed through the eye to the back of the head. The pain was brief, and he was then able to see objects distinctly. From this occasion he steadily improved until he was able to walk about without a guide.

Le Conte mentions the case of a negress who was struck by lightning August 19, 1842, on a plantation in Georgia. For years before the reception of the shock her health had been very bad, and she seemed to be suffering from a progressive emaciation and feebleness akin to chlorosis. The difficulty had probably followed a protracted amenorrhea, subsequent to labor and a retained placenta. In the course of a week she had recovered from the effects of lightning and soon experienced complete restoration to health; and for two years had been a remarkably healthy and vigorous laborer. Le Conte quotes five similar cases, and mentions one in which a lightning-shock to a woman of twenty-nine produced amenorrhea, whereas she had previously suffered from profuse menstruation, and also mentions another case of a woman of seventy who was struck unconscious; the catamenial discharge which had ceased twenty years before, was now permanently reestablished, and the shrunken mammæ again resumed their full contour.

A peculiar feature or superstition as to lightning-stroke is its **photographic properties.** In this connection Stricker of Frankfort quotes the case of Raspail[a] of a man of twenty-two who, while climbing a tree to a bird's nest, was struck by lightning, and afterward showed upon his breast a picture of the tree, with the nest upon one of its branches. Although in the majority of cases the photographs resembled trees, there was one case in which it resembled a horse-shoe; another, a cow; a third, a piece of furniture; a fourth, the whole surrounding landscape. This theory of lightning-photographs of neighboring objects on the skin has probably arisen from the resemblance of the burns due to the ramifications of the blood-vessels as conductors, or to peculiar electric movements which can be demonstrated by positive charges on lycopodium powder.

A lightning-stroke does not exhaust its force on a few individuals or objects, but sometimes produces serious **manifestations over a large area,** or on a great number of people. It is said[b] that a church in the village of Chateauneuf, in the Department of the Lower Alps, in France, was struck by three successive lightning strokes on July 11, 1819, during the installation of a new pastor. The company were all thrown down, nine were killed and 82 wounded. The priest, who was celebrating mass, was not affected, it is believed, on account of his silken robe acting as an insulator. Bryant[c] of Charlestown, Mass., has communicated the particulars of a stroke of lightning on June 20, 1829, which shocked several hundred persons. The effect of this discharge was felt over an area of 172,500 square feet with nearly the same degree of intensity. Happily, there was no permanent injury recorded. Le Conte reports that a person may be killed when some distance

[a] 161, xxii. [b] 139, T. xii. [c] 12

—even as far as 20 miles away from the storm—by what Lord Mahon calls the "returning stroke."

Skin-grafting is a subject which has long been more or less familiar to medical men, but which has only recently been developed to a practically successful operation. The older surgeons knew that it was possible to re-unite a resected nose or an amputated finger, and in Hunter's time tooth-replantation was quite well known. Smellie [739] has recorded an instance in which, after avulsion of a nipple in suckling, restitution was effected. It is not alone to the skin that **grafting** is applicable; it is used **in the cornea, nerves, muscles, bones, tendons,** and **teeth.** Wolfer has been successful in **transplanting the mucous membranes** of frogs, rabbits, and pigeons to a portion of mucous membrane previously occupied by cicatricial tissue, and was the first to show that on mucous surfaces, mucous membrane remains mucous membrane, but when transplanted to skin, it becomes skin. Attempts have been made to transplant a button of clear cornea of a dog, rabbit, or cat to the cornea of a human being, opaque as the result of ophthalmia, and von Hippel has devised a special method of doing this. Recently Fuchs [a] has reported his experience in cornea-grafting in sections, as a substitute for von Hippel's method, in parenchymatous keratitis and corneal staphyloma, and though not eminently successful himself, he considers the operation worthy of trial in cases that are without help, and doomed to blindness.

John Hunter was the first to perform the **implantation of teeth**; and Younger the first to transplant the teeth of man in the jaws of man; the initial operation should be called **replantation,** as it was merely the replacement of a tooth in a socket from which it had accidentally or intentionally been removed. Hunter drilled a hole in a cock's comb and inserted a tooth, and held it by a ligature. Younger drilled a hole in a man's jaw and implanted a tooth, and proved that it was not necessary to use a fresh tooth. Ottolengni [b] mentions the case of a man who was struck by a ruffian and had his two central incisors knocked out. He searched for them, washed them in warm water, carefully washed the teeth-sockets, and gently placed the teeth back in their position, where they remained firmly attached. At the time of report, six years after the accident, they were still firmly in position. Pettyjohn [c] reports a successful case of tooth-replantation in his young daughter of two, who fell on the cellar stairs, completely excising the central incisors. The alveolar process of the right jaw was fractured, and the gum lacerated to the entire length of the root. The teeth were placed in a tepid normal saline solution, and the child chloroformed, narcosis being induced in sleep; the gums were cleaned antiseptically, and 3½ hours afterward the child had the teeth firmly in place. They had been out of the mouth fully an hour. Four weeks afterward they were as firm as ever. By their

[a] 838, Nov., 1894. [b] 227, 1889, viii., 65. [c] 632, Jan., 1896.

experiments Gluck and Magnus prove that there is a return of activity after **transplantation of muscle.** After excision of malignant tumors of muscles, Helferich of Munich, and Lange of New York, have filled the gap left by the excision of the muscle affected by the tumor with transplanted muscles from dogs. Gluck has induced reproduction of lost tendons by grafting them with cat-gut, and according to Ashhurst, Peyrot has filled the gaps in retracted tendons by **transplanting tendons,** taken in one case from a dog, and in another from a cat.

Nerve-grafting, as a supplementary operation to neurectomy, has been practised, and Gersung has transplanted the nerves of lower animals to the nerve stumps of man.

Bone-grafting is quite frequently practised, portions from a recently amputated limb, or portions removed from living animals, or bone-chips, may be used. Senn proposed decalcified bone-plates to be used to fill in the gaps. Shifting of the bone has been done, *e. g.*, by dividing a strip of the hard palate covered with its soft parts, parallel to the fissure in cleft palate, but leaving unsevered the bony attachments in front, and partially fracturing the pedicle, drawing the bony flaps together with sutures; or, when forming a new nose, by turning down with the skin and periosteum the outer table of the frontal bone, split off with a chisel, after cutting around the part to be removed.[845] Trueheart reports a case of partial excision of the clavicle, successfully followed by the grafting of periosteal and osseous material taken from a dog. Robson and Hayes of Rochester, N. Y., have successfully supplemented excision of spina bifida by the transplantation of a strip of periosteum from a rabbit. Poncet hastened a cure in a case of necrosis with partial destruction of the periosteum by inserting grafts taken from the bones of a dead infant and from a kid. Ricketts speaks of bone-grafting and the use of ivory, and remarks that Poncet of Lyons restored a tibia in nine months by grafting to the superior articular surface. Recently amalgam fillings have been used in bone-cavities to supplant grafting.

In destructive injuries of the skin, various **materials** were **formerly used in grafting,** none of which, however, have produced the same good effect as the use of skin by the Thiersch Method, which will be described later.

Rodgers, U. S. N.,[a] reports the case of a white man of thirty-eight who suffered from gangrene of the skin of the buttocks caused by sitting in a pan of caustic potash. When seen the man was intoxicated, and there was a gangrenous patch four by six inches on his buttocks. Rodgers used grafts from the under wing of a young fowl, as suggested by Redard,[b] with good result. Vanmeter of Colorado[c] describes a boy of fourteen with a severe extensive burn; a portion beneath the chin and lower jaw, and the right arm from the elbow to the fingers, formed a granulating surface which would not heal, and grafting was resorted to. The neck-grafts were supplied by the skin of the

[a] 269, 1888. [b] 538, March 10, 1888. [c] Annals of Surgery, St. Louis, 1890.

father and brother, but the arm-grafts were taken from two young puppies of the Mexican hairless breed, whose soft, white, hairless skin seemed to offer itself for the purpose with good prospect of a successful result. The outcome was all that could be desired. The puppy-grafts took faster and proved themselves to be superior to the skin-grafts. There is a case reported [a] in which the skin of a greyhound seven days old, taken from the abdominal wall and even from the tail, was used with most satisfactory results in grafting an extensive ulcer following a burn on the left leg of a boy of ten. Masterman has grafted with the inner membrane of a hen's egg, and a Mexican surgeon, Altramirano, used the gills of a cock.

Fowler of Brooklyn [b] has grafted with the skin from the back and abdomen of a large frog. The patient was a colored boy of sixteen, who was extensively burned by a kerosene lamp. The burns were on the legs, thighs, buttocks, and right ankle, and the estimated area of burnt surface was 247.95 square inches. The frog skin was transferred to the left buttocks, and on the right buttocks eight long strips of white skin were transferred after the manner of Thiersch. A strip of human skin was placed in one section over the frog skin, but became necrotic in four days, not being attached to the granulating surface. The man was discharged cured in six months. The frog skin was soft, pliable, and of a reddish hue, while the human white skin was firm and rapidly becoming pigmented. Leale [c] cites the successful use of common warts in a case of grafting on a man of twenty who was burned on the foot by a stream of molten metal. Leale remarks that as common warts of the skin are collections of vascular papillæ, admitting of separation without injury to their exceptionally thick layer of epidermis, they are probably better for the purposes of skin-grafting than ordinary skin of less vitality or vascularity. Ricketts [d] has succeeded in grafting the skin of a frog to that of a tortoise, and also grafting frog skin to human skin. Ricketts remarks that the prepuce of a boy is remarkably good material for grafting. Sponge-grafts are often used to hasten cicatrization of integumental wounds. There is recorded [e] an instance in which the breast of a crow and the back of a rat were grafted together and grew fast. The crow dragged the rat along, and the two did not seem to care to part company.

Relative to skin-grafting proper, Bartens [f] succeeded in grafting the skin of a dead man of seventy on a boy of fourteen. Symonds [g] reports cases of skin-grafting of large flaps from amputated limbs, and says this method is particularly available in large hospitals where they have amputations and grafts on the same day. Martin has shown that, after many hours of exposure in the open air at a temperature of nearly 32° F., grafts could be successfully applied, but in such temperatures as 82° F., exposure of from six to seven hours destroyed their vitality, so that if kept cool, the limb of a healthy

[a] 476, March 6, 1890. [b] Annals of Surgery, St. Louis, 1889. [c] 538, 1879, xiv.
[d] 773, 1890. [e] 548, 1860, i., 282. [f] 199, 1888. [g] 224, 1889, ii., 1331.

individual amputated for some accident, may be utilized for grafting purposes.

Reverdin originated the procedure of epidermic grafting. Small grafts the size of a pin-head doing quite as well as large ones. Unfortunately but little diminution of the cicatricial contraction is effected by Reverdin's method. Thiersch contends that healing of a granulated surface results first from a conversion of the soft, vascular granulation-papillæ, by contraction of some of their elements into young connective-tissue cells, into "dry, cicatricial papillæ," actually approximating the surrounding tissues, thus diminishing the area to be covered by epidermis; and, secondly, by the covering of these papillæ by epidermic cells. Thiersch therefore recommends that for the prevention of cicatricial contraction, the grafting be performed with large strips of skin.

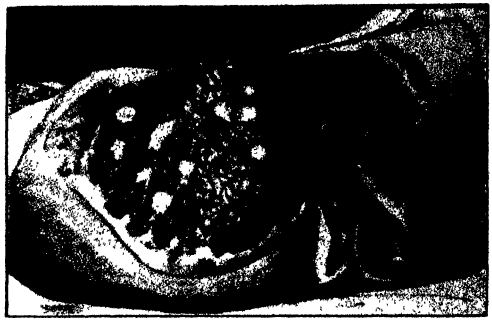


Fig. 228.—Extensive burn of the thigh, with skin-graft,—early stage (Harte).

Harte[a] gives illustrations of a case of extensive skin-grafting on the thigh from six inches above the great trochanter well over the median line anteriorly and over the buttock. This extent is shown in Figure 228, taken five months after the accident, when the granulations had grown over the edge about an inch. Figure 229 shows the surface of the wound, six and one-half months after the accident and three months after the applications of numerous skin-grafts.

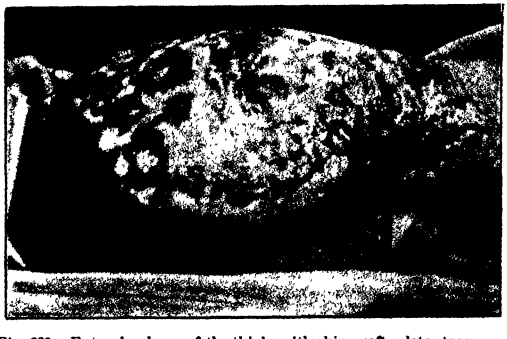


Fig. 229.—Extensive burn of the thigh, with skin-graft,—late stage.

Cases of **self-mutilation** may be divided into three classes:—those in which the injuries are inflicted in a moment of temporary insanity from hallucinations or melancholia; with suicidal intent; and in religious frenzy or emotion. Self-mutilation is seen **in the lower animals,** and Kennedy,[b] in mentioning the case of a hydrocephalic child who ate off its entire under lip, speaks also of a dog, of cats, and of a lioness who ate off their tails. Kennedy

[a] 792, Nov., 1892.

[b] 536, 1885, i., 211.

mentions the habit in young children of biting the finger-nails as an evidence of infantile trend toward self-mutilation. In the same discussion Collins states that he knew of an instance in India in which a horse lay down, deliberately exposing his anus, and allowing the crows to pick and eat his whole rectum. In temporary insanity, in fury, or in grief, the lower animals have been noticed by naturalists to mutilate themselves.

Self-mutilation in man is almost invariably the result of meditation over the generative function, and the great majority of cases of this nature are **avulsions or amputations of some parts of the genitalia.** The older records are full of such instances. Benivenius,[198] Blanchard,[213] Knackstedt, and Schenck cite cases. Smetius [a] mentions castration which was effected by using the finger-nails, and there is an old record in which a man avulsed his own genitals.[b] Scott [c] mentions an instance in which a man amputated his genitals and recovered without subsequent symptoms. Gockelius speaks of self-castration in a ruptured man, and Golding,[d] Guyon, Louis,[e] Laugier,[f] the Ephemerides, Alix, Marstral,[g] and others, record instances of self-castration. In his Essays Montaigne mentions an instance of complete castration performed by the individual himself.

Thiersch [h] mentions a case of a man who circumcised himself when eighteen. He married in 1870, and upon being told that he was a father he slit up the hypogastrium from the symphysis pubis to the umbilicus, so that the omentum protruded; he said his object was to obtain a view of the interior. Although the knife was dirty and blunt, the wound healed after the removal of the extruding omentum. A year later he laid open one side of the scrotum. The prolapsed testicle was replaced, and the wound healed without serious effect. He again laid open his abdomen in 1880, the wound again healing notwithstanding the prolapse of the omentum. In May of the same year he removed the right testicle, and sewed the wound up himself. Four days later the left was treated the same way. The spermatic cord however escaped, and a hematoma, the size of a child's head, formed on account of which he had to go to the hospital. This man acted under an uncontrollable impulse to mutilate himself, and claimed that until he castrated himself he had no peace of mind.

There is a similar report in an Italian journal[360] which was quoted in London.[i] It described a student at law, of delicate complexion, who at the age of fourteen gave himself up to masturbation. He continually studied until the age of nineteen, when he fell into a state of dulness, and complained that his head felt as if compressed by a circle of fire. He said that a voice kept muttering to him that his generative organs were abnormally deformed or the seat of disease. After that, he imagined that he heard a cry of "amputation! amputation!" Driven by this hallucination, he made his

[a] 730, 525. [b] 458, T. xvii., 404. [c] 524, ii., No. 7. [d] 528, vii., No. 6.
[e] 462, T. ix. [f] Ibid. [g] 462, T. viii. [h] 491, 1881, 253. [i] 548, 1854, ii., 94.

first attempt at self-mutilation ten days later. He was placed in an Asylum at Astino where, though closely watched, he took advantage of the first opportunity and cut off two-thirds of his penis, when the delirium subsided. Camp[a] describes a stout German of thirty-five who, while suffering from delirium tremens, fancied that his enemies were trying to steal his genitals, and seizing a sharp knife he amputated his penis close to the pubes. He threw the severed organ violently at his imaginary pursuers. The hemorrhage was profuse, but ceased spontaneously by the formation of coagulum over the mouth of the divided vessels. The wound was quite healed in six weeks, and he was discharged from the hospital, rational and apparently content with his surgical feat.

Richards[b] reports the case of a Brahman boy of sixteen who had contracted syphilis, and convinced, no doubt, that "nocit empta dolore voluptus," he had taken effective means of avoiding injury in the future by completely amputating his penis at the root. Some days after his admission to the hospital he asked to be castrated, stating that he intended to become an ascetic, and the loss of his testes as well as of his penis appeared to him to be an imperative condition to the attainment of that happy consummation. Chevers[266] mentions a somewhat similar case occurring in India.

Sands[c] speaks of a single man of thirty who amputated his penis. He gave an incomplete history of syphilis. After connection with a woman he became a confirmed syphilophobe and greatly depressed. While laboring under the hallucination that he was possessed of two bodies he tied a string around the penis and amputated the organ one inch below the glans. On loosening the string, three hours afterward, to enable him to urinate, he lost three pints of blood, but he eventually recovered. In the Pennsylvania Hospital Reports[623] there is an account of a married man who, after drinking several weeks, developed mania a potu, and was found in his room covered with blood. His penis was completely cut off near the pubes, and the skin of the scrotum was so freely incised that the testicles were entirely denuded, but not injured. A small silver cap was made to cover the sensitive urethra on a line with the abdominal wall.

There is a record[d] of a tall, powerfully-built Russian peasant of twenty-nine, of morose disposition, who on April 3d, while reading his favorite book, without uttering a cry, suddenly and with a single pull tore away his scrotum together with his testes. He then arose from the bank where he had been sitting, and quietly handed the avulsed parts to his mother who was sitting near by, saying to her: "Take that; I do not want it any more." To all questions from his relatives he asked pardon and exemption from blame, but gave no reason for his act. This patient made a good recovery at the hospital. Alexeef,[e] another Russian, speaks of a similar injury occurring during an attack of delirium tremens.

[a] 593, 1852. [b] 435, xii. [c] 127, 1871. [d] 697, 1887, 93, No. 5. [e] 556, 1882, No. 22.

Black [a] details the history of a young man of nineteen who went to his bath-room and deliberately placing his scrotum on the edge of the tub he cut it crossways down to the wood. He besought Black to remove his testicle, and as the spermatic cord was cut and much injured, and hemorrhage could only be arrested by ligature, the testicle was removed. The reason assigned for this act of mutilation was that he had so frequent nocturnal emissions that he became greatly disgusted and depressed in spirit thereby. He had practiced self-abuse for two years and ascribed his emissions to this cause. Although his act was that of a maniac, the man was perfectly rational. Since the injury he had had normal and frequent emissions and erections.

Orwin [b] mentions the case of a laborer of forty who, in a fit of remorse after being several days with a prostitute, atoned for his unfaithfulness to his wife by opening his scrotum and cutting away his left testicle with a pocket knife. The missing organ was found about six yards away covered with dirt. At the time of infliction of this injury the man was calm and perfectly rational. Warrington [c] relates the strange case of Isaac Brooks, an unmarried farmer of twenty-nine, who was found December 5, 1879, with extensive mutilations of the scrotum; he said that he had been attacked and injured by three men. He swore to the identity of two out of the three, and these were transported to ten years' penal servitude. On February 13, 1881, he was again found with mutilation of the external genitals, and again said he had been set upon by four men who had inflicted his injury, but as he wished it kept quiet he asked that there be no prosecution. Just before his death on December 31, 1881, he confessed that he had perjured himself, and that the mutilations were self-performed. He was not aware of any morbid ideas as to his sexual organs, and although he had an attack of gonorrhea ten years before he seemed to worry very little over it. There is an account [d] of a Scotch boy who wished to lead a "holy life," and on two occasions sought the late Mr. Liston's skilful aid in pursuance of this idea. He returned for a third time, having himself unsuccessfully performed castration.

A case of self-mutilation by a soldier who was confined in the guard-house for drunkenness is related by Beck.[e] The man borrowed a knife from a comrade and cut off the whole external genital apparatus, remarking as he flung the parts into a corner: "Any —— fool can cut his throat, but it takes a soldier to cut his privates off!" Under treatment he recovered, and then he regretted his action.

Sinclair [f] describes an Irishman of twenty-five who, maniacal from intemperance, first cut off one testicle with a wire nail, and then the second with a trouser-buckle. Not satisfied with the extent of his injuries he drove a nail into his temple, first through the skin by striking it with his hand, and then by butting it against the wall,—the latter maneuver causing his death.

[a] 536, 1889, ii, 32. [b] 224, 1882, i., 105. [c] 224, 1882, i., 72.
[d] 476, 1882, i., 118. [e] 124, 1847, 265. [f] 178, Jan., 1886.

There is on record [a] the history of an insane medical student in Dublin who **extirpated both eyes** and threw them on the grass. He was in a state of acute mania, and the explanation offered was that as a "grinder" before examination he had been diligently studying the surgery of the eye, and particularly that relating to enucleation. Another Dublin case quoted by the same authority was that of a young girl who, upon being arrested and committed to a police-cell, in a state of furious drunkenness, tore out both her eyes. In such cases, as a rule, the finger-nails are the only instrument used. There is a French case also quoted of a woman of thirty-nine who had borne children in rapid succession. While suckling a child three months old she became much excited, and even fanatical, in reading the Bible. Coming to the passage, "If thy right eye offend thee, pluck it out, etc.," she was so impressed with the necessity of obeying the divine injunction that she enucleated her eye with a meat-hook. There is mentioned [b] the case of a young woman who cut off her right hand and cast it into the fire, and attempted to enucleate her eyes, and also to hold her remaining hand in the fire. Haslam [c] reports the history of a female who mutilated herself by grinding glass between her teeth.

Channing [d] gives an account of the case of Helen Miller, a German Jewess of thirty, who was admitted to the Asylum for Insane Criminals at Auburn, N. Y., in October, 1872, and readmitted in June, 1875, suffering from simulation of hematemesis. On September 25th she cut her left wrist and right hand; in three weeks she became again "discouraged" because she was refused opium, and again cut her arms below the elbows, cleanly severing the skin and fascia, and completely hacking the muscles in every direction. Six weeks later she repeated the latter feat over the seat of the recently healed cicatrices. The right arm healed, but the left showed erysipelatous inflammation, culminating in edema, which affected the glottis to such an extent that tracheotomy was performed to save her life. Five weeks after convalescence, during which her conduct was exemplary, she again cut her arms in the same place. In the following April, for the merest trifle, she again repeated the mutilation, but this time leaving pieces of glass in the wounds. Six months later she inflicted a wound seven inches in length, in which she inserted 30 pieces of glass, seven long splinters, and five shoe-nails. In June, 1877, she cut herself for the last time. The following articles were taken from her arms and preserved: Ninety-four pieces of glass, 34 splinters, two tacks, five shoe-nails, one pin, and one needle, besides other things which were lost,—making altogether about 150 articles.

"Needle-girls," etc.—A peculiar type of self-mutilation is the habit sometimes seen in hysteric persons of piercing their flesh with numerous needles or pins. Herbolt of Copenhagen [e] tells of a young Jewess from whose

[a] 536, 1888, ii., 260. [b] 476, 1851. [c] Quoted 465, July, 1875.
[d] 123, xxxiv., 368. [e] Journal des Debats, 1823.

body, in the course of eighteen months, were extracted 217 needles. Sometime after 100 more came from a tumor on the shoulder. As all the symptoms in this case were abdominal, it was supposed that during an epileptic seizure this girl had swallowed the needles; but as she was of an hysteric nature it seems more likely they had entered the body through the skin. There is an instance [a] in which 132 needles were extracted from a young lady's person. Caen [b] describes a woman of twenty-six, while in prison awaiting trial, succeeding in committing suicide by introducing about 30 pins and needles in the chest region, over the heart. Her method was to gently introduce them, and then to press them deeper with a prayer-book. An autopsy showed that some of the pins had reached the lungs, some were in the mediastinum, on the back part of the right auricle; the descending vena cava was perforated, the anterior portion of the left ventricle was transfixed by a needle, and several of the articles were found in the liver. Andrews [c] removed 300 needles from the body of an insane female. The Lancet [d] records an account of a suicide by the penetration of a darning-needle in the epigastrium. There were nine punctures in this region, and in the last the needle was left in situ and fixed by worsted. In 1851 the same journal spoke of an instance in which 30 pins were removed from the limbs of a servant girl. It was said that while hanging clothes, with her mouth full of pins, she was slapped on the shoulder, causing her to start and swallow the pins. There is another report [e] of a woman who swallowed great numbers of pins. On her death one pound and nine ounces of pins were found in her stomach and duodenum. There are individuals known as "human pin-cushions," who publicly introduce pins and needles into their bodies for gain's sake.

The **wanderings of pins and needles in the body** are quite well known. Schenck records the finding of a swallowed pin in the liver. Haller mentions [f] one that made its way to the hand. Silvy speaks of a case in which a quantity of swallowed pins escaped through the muscles, the bladder, and vagina; there is another record in which the pins escaped many years afterward from the thigh.[g] The Philosophical Transactions contain a record of the escape of a pin from the skin of the arm after it had entered by the mouth. Gooch, Ruysch, Purmann, and Hoffman speak of needle-wanderings. Stephenson [h] gives an account of a pin which was finally voided by the bladder after forty-two years' sojourn in a lady's body. On November 15, 1802, the celebrated Dr. Lettsom spoke of an old lady who sat on a needle while riding in a hackney coach; it passed from the injured leg to the other one, whence it was extracted. Deckers tells of a gentleman who was wounded in the right hypochondrium, the ball being taken thirty years afterward from the knee. Borellus [841] gives an account of a thorn entering the digit and passing out of the body by the anus.

[a] 440, 1853. [b] 476, 1863, ii., 524. [c] 123, July, 1872. [d] 476, 1887, i., 230.
[e] 476, 1852. [f] 398, i., 586. [g] 398, i., 371. [h] Detroit Med. Jour., 1887, i., 895.

Strange as it may seem, **a prick of a pin** not entering a vital center or organ has been **the indirect cause of death.** Augenius writes of a tailor who died in consequence of a prick of a needle between the nail and flesh of the end of the thumb. Amatus Lusitanus [119] mentions a similar instance in an old woman, although, from the symptoms given, the direct cause was probably tetanus. In modern times Cunninghame,[a] Boring,[b] and Hobart[c] mention instances in which death has followed the prick of a pin ; in Boring's case the death occurred on the fifth day.

Manufacture of Crippled Beggars.—Knowing the sympathy of the world in general for a cripple, in some countries low in the moral scale, voluntary mutilation is sometimes practised by those who prefer begging to toiling. In the same manner **artificial monstrosities** have been manufactured solely for gain's sake. We quite often read of these instances in lay-journals, but it is seldom that a case comes under the immediate observation of a thoroughly scientific mind. There is, however, on record[d] a remarkable instance accredited to Jamieson of Shanghai who presented to the Royal College of Surgeons a pair of feet with the following history : Some months previously a Chinese beggar had excited much pity and made a good business by showing the mutilated stumps of his legs, and the feet that had belonged to them slung about his neck. While one day scrambling out of the way of a constable who had forbidden this gruesome spectacle, he was knocked down by a carriage in the streets of Shanghai, and was taken to the hospital, where he was questioned about the accident which deprived him of his feet. After selling the medical attendant his feet he admitted that he had purposely performed the amputations himself, starting about a year previously. He had fastened cords about his ankles, drawing them as tightly as he could bear them, and increasing the pressure every two or three days. For a fortnight his pain was extreme, but when the bones were bared his pains ceased. At the end of a month and a half he was able to entirely remove his feet by partly snapping and partly cutting the dry bone. Such cases appear to be quite common in China, and by investigation many parallels could elsewhere be found.

The Chinese custom of foot-binding is a curious instance of self-mutilation. In a paper quoted in the Philadelphia Medical Times, January 31, 1880, a most minute account of the modus operandi, the duration, and the suffering attendant on this process are given. Strapping of the foot by means of tight bandages requires a period of two or three years' continuance before the desired effect is produced. There is a varying degree of pain, which is most severe during the first year and gradually diminishes after the binding of all the joints is completed. During the binding the girl at night lies across the bed, putting her legs on the edge of the bedstead in such a manner as to make pressure under the knees, thus be-

[a] 381, 1829, ii., 21. [b] 176, 1872, 218. [c] 313, 1856, 473. [d] 224, 1882, i., 397.

numbing the parts below and avoiding the major degree of pain. In this position, swinging their legs backward and forward, the poor Chinese girls pass many a weary night. During this period the feet are unbound once a month only. The operation is begun by placing the end of a long, narrow bandage on the inside of the instep and carrying it over the four smaller toes, securing them under the foot. After several turns the bandage is reversed so as to compress the foot longitudinally. The young girl is then left for a month, and when the bandage is removed the foot is often found gangrenous and ulcerated, one or two toes not infrequently being lost. If the foot is thus bound for two years it becomes virtually dead and painless. By this time the calf disappears from lack of exercise, the bones are attenuated, and all the parts are dry and shrivelled. In after-life the leg frequently regains its muscles and adipose tissue, but the foot always remains small. The binding process is said to exert a markedly depressing influence upon the emotional character of the subject, which lasts through life, and is very characteristic.

To show how minute some of the feet of the Chinese women are, Figure I. of the accompanying plate (Plate 8), taken from a paper by Kenthughes on the "Feet of Chinese Ladies"[a] is from a photograph of a shoe that measured only 3¼ inches anteroposteriorly. The foot which it was intended to fill must have been smaller still, for the bandage would take up a certain amount of space. Figure II. is a reproduction of a photograph of a foot measuring 5½ inches anteroposteriorly, the wrinkled appearance of the skin being due to prolonged immersion in spirit. This photograph shows well the characteristics of the Chinese foot—the prominent and vertically placed heel, which is raised generally about an inch from the level of the great toe; the sharp artificial cavus, produced by the altered position of the os calcis, and the downward deflection of the foot in front of the mediotarsal joint; the straight and downward pointing great toe, and the infolding of the smaller toes underneath the great toe. In Figure III. we have a photograph of the skeleton of a Chinese lady's foot about five inches in anteroposterior diameter. The mesial axis of the os calcis is almost directly vertical, with a slight forward inclination, forming a right angle with the bones in front of the mediotarsal joint. The upper three-quarters of the anterior articular surface of the calcis is not in contact with the cuboid, the latter being depressed obliquely forward and downward, the lower portion of the posterior facet on the cuboid articulating with a new surface on the under portion of the bone. The general shape of the bone closely resembles that of a normal one—a marked contrast to its wasted condition and tapering extremity in paralytic calcaneus. Extension and flexion at the ankle are only limited by the shortness of the ligaments; there is no opposition from the conformation of the bones. The astragalus is almost of normal shape; the trochlea is slightly prolonged anteriorly, especially on the inner side, from

[a] Intercolonial Journal of Medicine and Surgery, Melbourne, 1894.

PLATE 8.

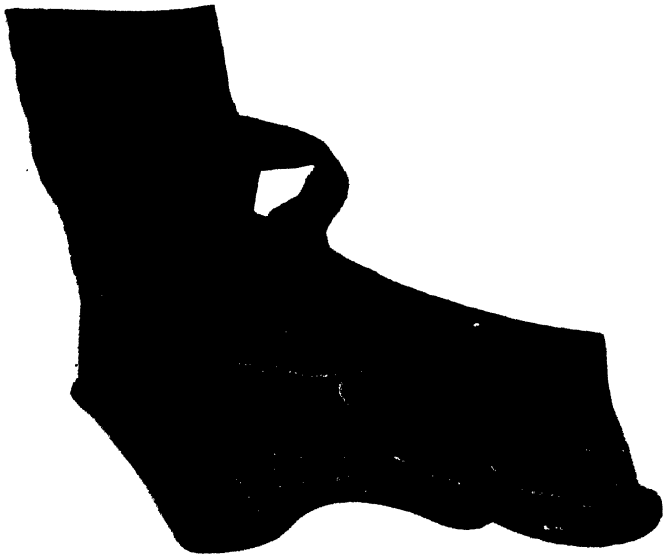


FIG. I.—FULL SIZE.

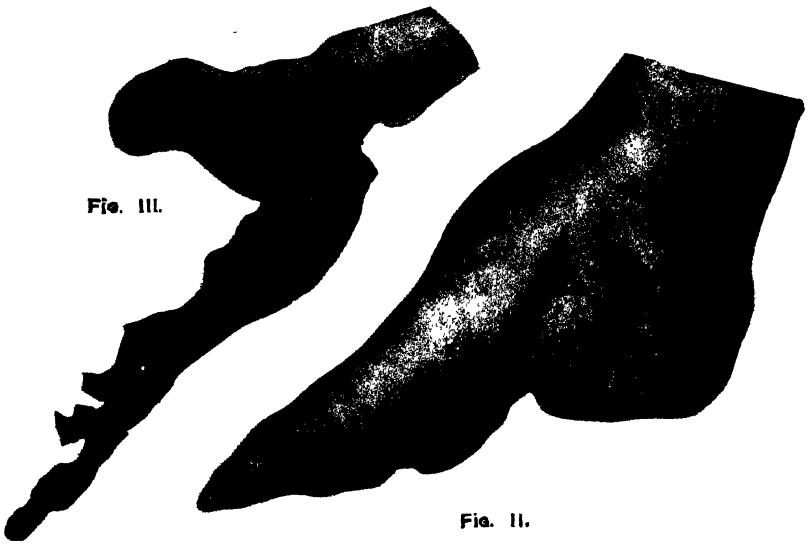


FIG. III.

FIG. II.

Chinese foot-binding (Kenthughes).

contact with the tibial articular surface. The cartilage on the exposed posterior portion of the trochlea seems healthy. The head of the astragalus is very prominent on the outer side, the scaphoid being depressed downward and inward away from it. The anterior articular surface is prolonged in the direction of the displaced scaphoid. The scaphoid, in addition to its displacement, is much compressed on the plantar surface, being little more than one-half the width of the dorsal surface. The cuboid is displaced obliquely downward and forward, so that the upper part of the posterior articular surface is not in contact with the calcis.

A professional leg-breaker is described in the Weekly Medical Review of St. Louis, April, 1890. This person's name was E. L. Landers, and he was accredited with earning his living by breaking or pretending to break his leg in order to collect damages for the supposed injury. Moreover, this individual had but one leg, and was compelled to use crutches. At the time of report he had succeeded in obtaining damages in Wichita, Kansas, for a supposed fracture. The Review quotes a newspaper account of this operation as follows :—

"According to the Wichita Dispatch he represented himself as a telegraph operator who was to have charge of the postal telegraph office in that city as soon as the line reached there. He remained about town for a month until he found an inviting piece of defective sidewalk, suitable for his purpose, when he stuck his crutch through the hole and fell screaming to the ground, declaring that he had broken his leg. He was carried to a hospital, and after a week's time, during which he negotiated a compromise with the city authorities and collected $1000 damages, a confederate, claiming to be his nephew, appeared and took the wounded man away on a stretcher, saying that he was going to St. Louis. Before the train was fairly out of Wichita, Landers was laughing and boasting over his successful scheme to beat the town. The Wichita story is in exact accord with the artistic methods of a one-legged sharper who about 1878 stuck his crutch through a coal-hole here, and, falling heels over head, claimed to have sustained injuries for which he succeeded in collecting something like $1500 from the city. He is described as a fine-looking fellow, well dressed, and wearing a silk hat. He lost one leg in a railroad accident, and having collected a good round sum in damages for it, adopted the profession of leg-breaking in order to earn a livelihood. He probably argued that as he had made more money in that line than in any other he was especially fitted by natural talents to achieve distinction in this direction. But as it would be rather awkward to lose his remaining leg altogether he modified the idea and contents himself with collecting the smaller amounts which ordinary fractures of the hip-joint entitle such an expert 'fine worker' to receive.

"He first appeared here in 1874 and succeeded, it is alleged, in beating the Life Association of America. After remaining for some time in the hos-

pital he was removed on a stretcher to an Illinois village, from which point the negotiations for damages were conducted by correspondence, until finally a point of agreement was reached and an agent of the company was sent to pay him the money. This being accomplished the agent returned to the depot to take the train back to St. Louis when he was surprised to see the supposed sufferer stumping around on his crutches on the depot platform, laughing and jesting over the ease with which he had beaten the corporation.

"He afterward fell off a Wabash train at Edwardsville and claimed to have sustained serious injuries, but in this case the company's attorneys beat him and proved him to be an impostor. In 1879 he stumbled into the telegraph office at the Union Depot here, when Henry C. Mahoney, the superintendent, catching sight of him, put him out, with the curt remark that he didn't want him to stick that crutch into a cuspidor and fall down, as it was too expensive a performance for the company to stand. He beat the Missouri Pacific and several other railroads and municipalities at different times, it is claimed, and manages to get enough at each successful venture to carry him along for a year or eighteen months, by which time the memory of his trick fades out of the public mind, when he again bobs up serenely."

Anomalous Suicides.—The literature on suicide affords many instances of self-mutilations and ingenious modes of producing death. In the Dublin Medical Press for 1854 there is an extraordinary case of suicide, in which the patient thrust a red-hot poker into his abdomen and subsequently pulled it out, detaching portions of the omentum and 32 inches of the colon. Another suicide in Great Britain swallowed a red-hot poker.[a] In commenting on suicides, in 1835, Arntzenius speaks of an ambitious Frenchman who was desirous of leaving the world in a distinguished manner, and who attached himself to a rocket of enormous size which he had built for the purpose, and setting fire to it, ended his life. On September 28, 1895, according to the Gaulois and the New York Herald (Paris edition) of that date, there was admitted to the Hôpital St. Louis a clerk, aged twenty-five, whom family troubles had rendered desperate and who had determined to seek death as a relief from his misery. Reviewing the various methods of committing suicide he found none to his taste, and resolved on something new. Being familiar with the constituents of explosives, he resolved to convert his body into a bomb, load it with explosives, and thus blow himself to pieces. He procured some powdered sulphur and potassium chlorate, and placing each in a separate wafer he swallowed both with the aid of water. He then lay down on his bed, dressed in his best clothes, expecting that as soon as the two explosive materials came into contact he would burst like a bomb and his troubles would be over. Instead of the anticipated result the most violent collicky pains ensued, which finally became so great that he had to summon his neighbors, who took him to the hospital, where, after vigorous application with the stomach-pump, it

[a] 548, 1856, 103.

was hoped that his life would be saved. Sankey[a] mentions an epileptic who was found dead in his bed in the Oxford County Asylum; the man had accomplished his end by placing a round pebble in each nostril, and thoroughly impacting in his throat a strip of flannel done up in a roll. In his "Institutes of Surgery" Sir Charles Bell remarks that his predecessor at the Middlesex Hospital entered into a conversation with his barber over an attempt at suicide in the neighborhood, during which the surgeon called the "would-be suicide" a fool, explaining to the barber how clumsy his attempts had been, at the same time giving him an extempore lecture on the anatomic construction of the neck, and showing him how a successful suicide in this region should be performed. At the close of the conversation the unfortunate barber retired into the back area of his shop, and following minutely the surgeon's directions, cut his throat in such a manner that there was no hope of saving him. It is supposed that one could commit suicide by completely gilding or varnishing the body, thus eliminating the excretory functions of the skin. There is an old story of an infant who was gilded to appear at a Papal ceremony who died shortly afterward from the suppression of the skin-function. The fact is one well established among animals, but after a full series of actual experiments, Tecontjeff of St. Petersburg concludes that in this respect man differs from animals. This authority states that in man no tangible risk is entailed by this process, at least for any length of time required for therapeutic purposes. "Tarred and feathered" persons rarely die of the coating of tar they receive. For other instances of peculiar forms of suicide reference may be made to numerous volumes on this subject, prominent among which is that by Brierre de Boismont,[226] which, though somewhat old, has always been found trustworthy, and also to the chapters on this subject written by various authors on medical jurisprudence.

Religious and Ceremonial Mutilations.—Turning now to the subject of self-mutilation and self-destruction from the peculiar customs or religious beliefs of people, we find pages of information at our disposal. It is not only among the savage or uncivilized tribes that such ideas have prevailed, but from the earliest times they have had their influence upon educated minds. In the East, particularly in India, the doctrines of Buddhism, that the soul should be without fear, that it could not be destroyed, and that the flesh was only its resting-place, the soul several times being reincarnated, brought about great indifference to bodily injuries and death. In the history of the Brahmans there was a sect of philosophers called the Gymnosophists, who had the extremest indifference to life. To them incarnation was a positive fact, and death was simply a change of residence. One of these philosophers, Calanus, was burned in the presence of Alexander; and, according to Plutarch, three centuries later another Gymnosophist named Jarmenochegra, was similarly burned before Augustus. Since this time, according to Brierre

[a] 224, 1883, i., 88.

de Boismont,[226] the suicides from indifference to life in this mystic country are counted by the thousands. Penetrating Japan the same sentiment, according to report, made it common in the earlier history of that country to see ships on its coasts, filled with fanatics who, by voluntary dismantling, submerged the vessels little by little, the whole multitude sinking into the sea while chanting praises to their idols. The same doctrines produced the same result in China. According to Brucker[a] it is well known that among the 500 philosophers of the college of Confucius, there were many who disdained to survive the loss of their books (burned by order of the savage Emperor Chi-Koung-ti), and throwing themselves into the sea, they disappeared under the waves. According to Brierre de Boismont, voluntary mutilation or death was very rare among the Chaldeans, the Persians, or the Hebrews, their precepts being different from those mentioned. The Hebrews in particular had an aversion to self-murder, and during a period in their history of 4000 years there were only eight or ten suicides recorded. Josephus shows what a marked influence on suicides the invasion of the Romans among the Hebrews had.

In Africa, as in India, there were Gymnosophists. In Egypt Sesostris, the grandest king of the country, having lost his eyesight in his old age, calmly and deliberately killed himself. About the time of Mark Anthony and Cleopatra, particularly after the battle of Actium, suicide was in great favor in Egypt. In fact a great number of persons formed an academy called The Synapothanoumenes, who had for their object the idea of dying together. In Western Europe, as shown in the ceremonies of the Druids, we find among the Celts a propensity for suicide and an indifference to self-torture. The Gauls were similarly minded, believing in the dogma of immortality and eternal repose. They thought little of bodily cares and ills. In Greece and Rome there was always an apology for suicide and death in the books of the philosophers. "*Nil igitur mors est, ad nos neque pertinet hilum; quando quidem natura animi mortalis habetur!*" cries Lucretius. With the advent of Christianity, condemning as it did the barbarous customs of self-mutilation and self-murder, these practices seem to disappear gradually; but stoicism and indifference to pain were exhibited in martyrdom. Toward the middle ages, when fanaticism was at its height and the mental malady of demoniacal possession was prevalent, there was something of a reversion to the old customs. In the East the Juggernaut procession was still in vogue, but this was suppressed by civilized authorities; outside of a few minor customs still prevalent among our own people we must to-day look to the savage tribes for the perpetuation of such practices.

In an excellent article on the evolution of ceremonial institutions[b] Herbert Spencer mentions the Fuegians, Veddahs, Andamanese, Dyaks, Todas, Gonds, Santals, Bodos, and Dhimals, Mishmis, Kamchadales, and Snake

[a] "Hist. Nat. Philos.," T. iv., 11 and 670.

[b] 638, April, 1878.

Indians, as among people who form societies to practise simple mutilations in slight forms. Mutilations in somewhat graver forms, but still in moderation, are practised by the Tasmanians, Tamaese, the people of New Guinea, Karens, Nagas, Ostiaks, Eskimos, Chinooks, Comanches, and Chippewas. What might be called mixed or compound mutilations are practised by the New Zealanders, East Africans, Kondes, Kukas, and Calmucks. Among those practising simple but severe mutilations are the New Caledonians, the Bushmen, and some indigenous Australians. Those tribes having for their customs the practice of compound major mutilations are the Fiji Islanders, Sandwich Islanders, Tahitians, Tongans, Samoans, Javanese, Sumatrans, natives of Malagasy, Hottentots, Damaras, Bechuanas, Kaffirs, the Congo people, the Coast Negroes, Inland Negroes, Dahomeans, Ashantees, Fulahs, Abyssinians, Arabs, and Dakotas. Spencer has evidently made a most extensive and comprehensive study of this subject, and his paper is a most valuable contribution to the subject. In the preparation of this section we have frequently quoted from it.

The practice of **self-bleeding** has its origin in other mutilations, although the Aztecs shed human blood in the worship of the sun. The Samoïedes have a custom of **drinking** the **blood** of warm animals. Those of the Fijians who were cannibals drank the warm blood of their victims. Among the Amaponda Kaffirs there are horrible accounts of kindred savage customs. Spencer quotes :—"It is usual for the ruling chief on his accession to be washed in the blood of a near relative, generally a brother, who is put to death for the occasion." During a Samoan marriage-ceremony the friends of the bride "took up stones and beat themselves until their heads were bruised and bleeding." In Australia a novitiate at the ceremony of manhood drank a mouthful of blood from the veins of the warrior who was to be his sponsor.

At the death of their kings the Lacedemonians met in large numbers and tore the flesh from their foreheads with pins and needles. It is said that when Odin was near his death he ordered himself to be marked with a spear; and Niort, one of his successors, followed the example of his predecessor. Shakespeare speaks of "such as boast and show their scars." In the olden times it was not uncommon for a noble soldier to make public **exhibition of his scars** with the greatest pride; in fact, on the battlefield they invited the reception of superficial disfiguring injuries, and to-day some students of the learned universities of Germany seem prouder of the possession of scars received in a duel of honor than in awards for scholastic attainments.

Lichtenstein tells of priests among the Bechuanas who made long cuts from the thigh to the knee of each warrior who slew an enemy in battle. Among some tribes of the Kaffirs a kindred custom was practised; and among the Damaras, for every wild animal a young man destroyed his father made four incisions on the front of his son's body. Speaking of certain

Congo people, Tuckey says that they scar themselves principally with the idea of rendering themselves agreeable to the women of their tribe. Among the Itzaex Indians of Yucatan, a race with particularly handsome features, some are marked with scarred lines, inflicted as signs of courage.

Cosmetic Mutilations.—In modern times there have been individuals expert in removing facial deformities, and by operations of various kinds producing pleasing dimples or other artificial signs of beauty. We have seen an apparatus advertised to be worn on the nose during the night for the purpose of correcting a disagreeable contour of this organ. A medical description of the artificial **manufacture of dimples** is as follows :—[a] "The modus operandi was to make a puncture in the skin where the dimple was required, which would not be noticed when healed, and, with a very delicate instrument, remove a portion of the muscle. Inflammation was then excited in the skin over the subcutaneous pit, and in a few days the wound, if such it may be called, was healed, and a charming dimple was the result." It is quite possible that some of our modern operators have overstepped the bounds of necessity, and performed unjustifiable plastic operations to satisfy the vanity of their patients.

Dobrizhoffer says of the Abipones that boys of seven **pierce their little arms** in imitation of their parents. Among some of the indigenous Australians it is quite customary for ridged and linear scars to be self-inflicted. In Tanna the people produce elevated scars on the arms and chests. Bancroft recites that family-marks of this nature existed among the Cuebas of Central America, refusal being tantamount to rebellion. Schomburgk tells that among the Arawaks, after a Mariquawi dance, so great is their zeal for honorable scars, the blood will run down their swollen calves, and strips of skin and muscle hang from the mangled limbs. Similar practices rendered it necessary for the United States Government to stop some of the ceremonial dances of the Indians under their surveillance.

A peculiar custom among savages is the **amputation of a finger** as a sacrifice to a deity. In the tribe of the Dakotas the relatives of a dead chief pacified his spirit by amputating a finger. In a similar way, during his initiation, the young Mandan warrior, "holding up the little finger of his left hand to the Great Spirit," . . "expresses his willingness to give it as a sacrifice, and he lays it on the dried buffalo skull, when another chops it off near the hand with a blow of the hatchet." According to Mariner the natives of Tonga cut off a portion of the little finger as a sacrifice to the gods for the recovery of a superior sick relative. The Australians have a custom of cutting off the last joint of the little finger of females as a token of submission to powerful beings alive and dead. A Hottentot widow who marries a second time must have the distal joint of her little finger cut off; another joint is removed each time she remarries.

Among the mutilations submitted to on the death of a king or chief in the

[a] 224, 1880, ii., 609.

Sandwich Islands, Cook mentions in his "Voyages" the custom of **knocking out** from one to four **front teeth.**

Among the Australian tribes the age of virility and the transition into manhood is celebrated by ceremonial customs, in which the novices are subjected to minor mutilations. A sharp bone is used for lancing their gums, while the throw-stick is used for knocking out a tooth. Sometimes, in addition to this crude dentistry, the youth is required to submit to cruel gashes cut upon his back and shoulders, and should he flinch or utter any cry of pain he is always thereafter classed with women. Haygarth writes of a semi-domesticated Australian who said one day, with a look of importance, that he must go away for a few days, as he had grown to man's estate, and it was high time he had his teeth knocked out. It is an obligatory rite among various African tribes to lose two or more of their front teeth. A tradition among certain Peruvians was that the Conqueror Huayna Coapæ made a law that they and their descendants should have three front teeth pulled out in each jaw. Cieza speaks of another tradition requiring the extraction of the teeth of children by their fathers as a very acceptable service to their gods. The Damaras knock out a wedge-shaped gap between two of their front teeth; and the natives of Sierra Leone file or chip their teeth after the same fashion.

Depilatory customs are very ancient, and although minor in extent are still to be considered under the heading of mutilations. The giving of hair to the dead as a custom, has been perpetuated through many tribes and nations. In Euripides we find Electra admonishing Helen for sparing her locks, and thereby defrauding the dead. Alexander the Great shaved his locks in mourning for his friend, Hephæstion, and it was supposed that his death was hastened by the sun's heat on his bare head after his hat blew off at Babylon. Both the Dakota Indians and the Caribs maintain the custom of sacrificing hair to the dead. In Peru the custom was varied by pulling out eyelashes and eyebrows and presenting them to the sun, the hills, etc. It is said this custom is still in continuance. When Clovis was visited by the Bishop of Toulouse he gave him a hair from his beard and was imitated by his followers. In the Arthurian legends we find "Then went Arthur to Caerleon; and thither came messages from King Ryons who said, 'even kings have done me homage, and with their beards I have trimmed a mantle. Send me now thy beard, for there lacks yet one to the finishing of the mantle.'" The association between short hair and slavery arose from the custom of taking hair from the slain. It existed among the Greeks and Romans, and was well known among the indigenous tribes of this continent. Among the Shoshones he who took the most scalps gained the most glory.

In speaking of the prisoners of the Chicimecs Bancroft says they were often scalped while yet alive, and the bloody trophies placed on the heads of their tormentors. In this manner we readily see that long hair among the indigenous tribes and various Orientals, Ottomans, Greeks, Franks, Goths, etc.,

was considered a sign of respect and honor. The respect and preservation of the Chinese queue is well known in the present day. Wishing to divide their brother's kingdom, Clothair and Childebert consulted whether to cut off the hair of their nephews, the rightful successors, so as to reduce them to the rank of subjects, or to kill them. The gods of various people, especially the greater gods, were distinguished by their long beards and flowing locks. In all pictures Thor and Samson were both given long hair, and the belief in strength and honor from long hair is proverbial. Hercules is always pictured with curls. According to Goldzhier, long locks of hair and a long beard are mythologic attributes of the sun. The sun's rays are compared to long locks or hairs on the face of the sun. When the sun sets and leaves his place to the darkness, or when the powerful summer sun is succeeded by the weak rays of the winter sun, then Samson's long locks, through which alone his strength remains, are cut off by the treachery of his deceitful concubine Delilah (the languishing, according to the meaning of the name). The beaming Apollo was, moreover, called the "Unshaven;" and Minos cannot conquer the solar hero, Nisos, until the latter loses his golden hair. In Arabic "Shams-on" means the sun, and Samson had seven locks of hair, the number of the planetary bodies. In view of the foregoing facts it seems quite possible that the majority of depilatory processes on the scalp originated in sun-worship, and through various phases and changes in religions were perpetuated to the Middle Ages. Charles Martel sent Pepin, his son, to Luithprand, king of the Lombards, that he might cut his first locks, and by this ceremony hold for the future the place of his illustrious father. To make peace with Alaric, Clovis became his adopted son by offering his beard to be cut. Among the Caribs the hair constituted their chief pride, and it was considered unequivocal proof of the sincerity of their sorrow, when on the death of a relative they cut their hair short. Among the Hebrews shaving of the head was a funeral rite, and among the Greeks and Romans the hair was cut short in mourning, either for a relative or for a celebrated personage. According to Krehl the Arabs also had such customs. Spencer mentions that during an eruption in Hawaii, "King Kamahameha cut off part of his own hair" . . . "and threw it into the torrent (of lava)."

The Tonga regarded the pubic hairs as under the special care of the devil, and with great ceremony made haste to remove them. The female inhabitants of some portions of the coast of Guinea remove the pubic hairs as fast as they appear. A curious custom of Mohammedan ladies after marriage is to rid themselves of the hirsute appendages of the pubes. Depilatory ointments are employed, consisting of equal parts of slaked lime and arsenic made into a paste with rose-water. It is said that this important ceremony is not essential in virgins. One of the ceremonies of assuming the toga virilis among the indigenous Australians consists in submitting to having each particular hair plucked singly from the body, the candidate being required not

to display evidences of pain during the operation. Formerly the Japanese women at marriage blackened their teeth and shaved or pulled out their eyebrows.

The custom of **boring the ear** is very old, mention of it being made in Exodus xxi., 5 and 6, in which we find that if a Hebrew servant served for six years, his freedom was optional, but if he plainly said that he loved his master, and his wife and children, and did not desire to leave their house, the master should bring him before the judges; and according to the passage in Exodus, "he shall also bring him to the door or unto the doorpost, and his master shall bore his ear through with an awl; and he shall serve him forever." All the Burmese, says Sangermano, without exception, have the custom of boring their ears. The days when the operations were performed

Fig. 230.—Perforation of the ears and lip practised by the Botocudos.

were kept as festivals. The ludicrous custom of piercing the ears for the wearing of ornaments, typical of savagery and found in all indigenous African tribes, is universally prevalent among our own people.

The extremists in this custom are the Botocudos, who represent the most cruel and ferocious of the Brazilian tribes, and who especially cherish a love for cannibalism. They have a fondness for disfiguring themselves by inserting in the lower parts of their ears and in their under lips variously shaped pieces of wood ornaments called *peleles*, causing enormous protrusion of the under lip and a repulsive wide mouth, as shown in Figure 230.

Tattooing is a peculiar custom originating in various ways. The materials used are vermilion, indigo, carbon, or gunpowder. At one time this custom was used in the East to indicate caste and citizenship. Both sexes of the Sandwich Islanders have a peculiar tattooed mark indicative of their tribe or

district. Among the Uapes, one tribe, the Tucanoes, have three vertical blue lines. Among other people tattooed marks indicated servility, and Boyle says the Kyans, Pakatans, and Kermowits alone, among the Borneo people, practised tattooing, and adds that these races are the least esteemed for bravery. Of the Fijians the women alone are tattooed, possibly as a method of adornment.

The tattooing of the people of Otaheite, seen by Cook, was surmised by him to have a religious significance, as it presented in many instances "squares, circles, crescents, and ill-designed representations of men and dogs." Every one of these people was tattooed upon reaching majority. According to Carl Bock, among the Dyaks of Borneo all of the married women were tattooed on the hands and feet, and sometimes on the thighs. The decoration is one of the privileges of matrimony, and is not permitted to unmarried girls. Andrew Lang says of the Australian tribes that the Wingong or the Totem of each man is indicated by a tattooed representation of it on his flesh. The celebrated American traveler, Carpenter, remarks that on his visit to a great prison in Burmah, which contains more than 3000 men, he saw 6000 tattooed legs. The origin of the custom he was unable to find out, but in Burmah tattooing was a sign of manhood, and professional tattooers go about with books of designs, each design warding off some danger. Bourke quotes that among the Apaches-Yumas of Arizona the married women are distinguished by several blue lines running from the lower lip to the chin; and he remarks that when a young woman of this tribe is anxious to become a mother she tattoos the figure of a child on her forehead. After they marry Mojave girls tattoo the chin with vertical blue lines; and when an Eskimo wife has her face tattooed with lamp-black she is regarded as a matron in society. The Polynesians have carried this dermal art to an extent which is unequaled by any other people; and it is universally practised among them. Quoted by Burke, Sullivan states that the custom of tattooing continued in England and Ireland down to the seventh century. This was the tattooing with the woad. Fletcher remarks that at one time, about the famous shrine of Our Lady of Loretto, were seen professional tattooers, who for a small sum of money would produce a design commemorative of the pilgrim's visit to the shrine. A like profitable industry is pursued in Jerusalem.

Universal tattooing in some of the Eastern countries is used as a means of criminal punishment, the survival of the persecuted individual being immaterial to the torturers, as he would be branded for life and ostracized if he recovered. Illustrative of this O'Connell[a] tells of a case in Hebra's clinic. The patient, a man five feet nine inches in height, was completely tattooed from head to foot with all sorts of devices, such as elephants, birds, lions, etc., and across his forehead, dragons. Not a square of even a quarter inch had been exempt from the process. According to his tale this man had been

[a] 218, 1871, 323.

a leader of a band of Greek robbers, organized to invade Chinese Tartary, and, together with an American and a Spaniard, was ordered by the ruler of the invaded province to be branded in this manner as a criminal. It took three months' continuous work to carry out this sentence, during which his comrades succumbed to the terrible agonies. During the entire day for this extended period indigo was pricked in this unfortunate man's skin. Accounts such as this have been appropriated by exhibitionists, who have caused themselves to be tattooed merely for mercenary purposes. The accompanying illustration (Fig. 231) represents the appearance of a "tattooed man" who exhibited himself. He claimed that his tattooing was done by electricity. The design showing on his back is a copy of a picture of the Virgin Mary surrounded by 31 angels.

Fig. 231.—"Tattooed man."

The custom of tattooing the arms, chest, or back is quite prevalent, and particularly among sailors and soldiers. The sequences of this custom are sometimes quite serious. Syphilis has been frequently contracted in this manner, and Maury and Dulles have collected 15 cases of **syphilis acquired in tattooing.** Cheinisse[a] reports the case of a young blacksmith who had the emblems of his trade tattooed upon his right forearm. At the end of forty days small, red, scaly elevations appeared at five different points in the tattooed area. These broke down and formed ulcers. When examined these ulcers presented the peculiarities of chancres, and there was upon the body of the patient a well-marked syphilitic roseola. It was ascertained that during the tattooing the operator had moistened the ink with his own saliva.

Hutchinson exhibited[619] drawings and photographs showing the condition of the arms of two boys suffering from **tuberculosis of the skin,** who had been inoculated in the process of tattooing. The tattooing was done by the

[a] Arch. f. Dermatol. u. Syph., Band xxix., Heft 3.

brother of one of the lads who was in the last stages of phthisis, and who used his own saliva to mix the pigment. The cases were under the care of Murray of Tottenham, by whom they had been previously reported.[a] Williams[b] has reported the case of a militiaman of seventeen who, three days after an extensive tattooing of the left forearm, complained of pain, swelling, and tenderness of the left wrist. A day later acute left-sided pneumonia developed, but rapidly subsided. The left shoulder, knee, and ankle were successively involved in the inflammation, and a cardiac bruit developed. Finally chorea developed as a complication, limited for a time to the left side, but shortly spreading to the right, where rheumatic inflammation was attacking the joints. The last, however, quickly subsided, leaving a general, though mild chorea and a permanently damaged heart.

Infibulation of the male and female external genital organs for the prevention of sexual congress is a very ancient custom. The Romans infibulated their singers to prevent coitus, and consequent change in the voice, and pursued the same practice with their actors and dancers. According to Celsus, Mercurialis, and others, the gladiators were infibulated to guard against the loss of vigor by sexual excesses. In an old Italian work[c] there is a figure of an infibulated musician—a little bronze statue representing a lean individual tortured or deformed by carrying an enormous ring through the end of the penis. In one of his pleasantries Martial[d] says of these infibulated singers that they sometimes break their rings and fail to place them back—"*et cujus refibulavit turgidum faber penem.*" Heinsius considers Agamemnon cautious when he left Demodocus near Clytemnestra, as he remarks that Demodocus was infibulated. For such purposes as the foregoing infibulation offered a more humane method than castration.

Infibulation by a ring in the prepuce was used to prevent premature copulation, and was in time to be removed, but in some cases its function was the preservation of perpetual chastity. Among some of the religious mendicants in India there were some who were condemned to a life of chastity, and, in the hotter climates, where nudity was the custom, these persons traveled about exposing an enormous preputial ring, which was looked upon with adoration by devout women. It is said these holy persons were in some places so venerated that people came on their knees, and bowing below the ring, asked forgiveness—possibly for sexual excesses.

Rhodius mentions the usage of infibulation in antiquity, and Fabricius d'Aquapendente remarks that infibulation was usually practised in females for the preservation of chastity. No Roman maiden was able to preserve her virginity during participation in the celebrations in the Temples of Venus, the debauches of Venus and Mars, etc., wherein vice was authorized by divine injunction; for this reason the lips of the vagina were

[a] 224, 1895, i., 1200.
[b] 224, No. 1800, 1440.
[c] Monumenti antichi inediti, Giov. Winkelman, Romæ, 1767.
[d] 509, epig., 81, L. vii.

closed by rings of iron, copper, or silver, so joined as to hinder coitus, but not prevent evacuation. Different sized rings were used for those of different ages. Although this device provided against the coitus, the maiden was not free from the assaults of the Lesbians. During the Middle Ages, in place of infibulation, **chastity-girdles** were used, and in the Italian girdles, such as the one exhibited in the Musée Cluny in Paris, both the anus and vulva were protected by a steel covering perforated for the evacuations. In the Orient, particularly in India and Persia, according to old travelers,[a] the labia were sewed together, allowing but a small opening for excretions. Buffon and Brown mention infibulation in Abyssinia, the parts being separated by a bistoury at the time of marriage. In Circassia the women were protected by a copper girdle or a corset of hide and skin which, according to custom, only the husband could undo. Peney [b] speaks of infibulation for the preservation of chastity, as observed by him in the Soudan. Among the Nubians this operation was performed at about the age of eight with great ceremony, and when the time for marriage approached the vulva had to be opened by incision. Sir Richard Buxton, a distinguished traveler, also speaks of infibulation, and, according to him, at the time of the marriage ceremony the male tries to prove his manhood by using only Nature's method and weapon to consummate the marriage, but if he failed he was allowed artificial aid to effect entrance. Sir Samuel Baker is accredited in The Lancet with giving an account in Latin text of the modus operandi of a practice among the Nubian women of removing the clitoris and nymphæ in the young girl, and abrading the adjacent walls of the external labia so that they would adhere and leave only a urethral aperture.

This ancient custom of **infibulation** is occasionally seen at the present day in civilized countries, and some cases of infibulation from jealousy are on record. There is mentioned, as from the Leicester Assizes,[c] the trial of George Baggerly for execution of a villainous design on his wife. In jealousy he "had sewed up her private parts." Recently, before the New York Academy of Medicine, Collier [d] reported a case of pregnancy in a woman presenting nympha-infibulation. The patient sought the physician's advice in the summer of 1894, while suffering from uterine disease, and being five weeks pregnant. She was a German woman of twenty-eight, had been married several years, and was the mother of several children. Collier examined her and observed two holes in the nymphæ. When he asked her concerning these, she reluctantly told him that she had been compelled by her husband to wear a lock in this region. Her mother, prior to their marriage, sent her over to the care of her future husband (he having left Germany some months before). On her arrival he perforated the labia minora, causing

[a] Schulz, Indes-Orientales, and others.

[b] Bull. de la Soc. de Geograph., Paris, Series iv., xvii., 339.

[c] 374, 1737, vii., 250.

[d] 132, Dec. 15, 1894.

her to be ill several weeks; after she had sufficiently recovered he put on a padlock, and for many years he had practised the habit of locking her up after each intercourse. Strange to relate, no physician, except Collier, had ever inquired about the openings. In this connection the celebrated Harvey [a] mentions a mare with infibulated genitals, but these did not prevent successful labor.

Occasionally **infibulation** has been used **as a means of preventing masturbation.** De la Fontaine has mentioned this fact, and there is a case in this country in which acute dementia from masturbation was cured by infibulation.[b] In this instance the prepuce was perforated in two opposite places by a trocar, and two pewter sounds (No. 2) were introduced into the wounds and twisted like rings. On the eleventh day one of the rings was removed, and a fresh one introduced in a new place. A cure was effected in eight weeks. There is recent mention made [c] of a method of preventing masturbation by a cage fastened over the genitals by straps and locks. In cases of children the key was to be kept by the parents, but in adults to be put in some part of the house remote from the sleeping apartment, the theory being that the desire would leave before the key could be obtained.

Among some peoples the **urethra** was **slit up as a means of preventing conception,** making a meatus near the base of the penis. Herodotus remarks that the women of a certain portion of Egypt stood up while they urinated, while the men squatted. Investigation has shown that the women were obliged to stand up on account of elongated nymphæ and labia, while the men sought a sitting posture on account of the termination of the urethra being on the inferior side of the base of the penis, artificially formed there in order to prevent conception. In the Australian Medical Gazette, May, 1883, there is an account of some of the methods of the Central Australians of preventing conception. One was to make an opening into the male urethra just anterior to the scrotum, and another was to slit up the entire urethra so far as to make but a single canal from the scrotum to the glans penis. Bourke quotes Palmer in mentioning that it is a custom to split the urethra of the male of the Kalkadoon tribe, near Cloncurry, Queensland, Australia. Mayer of Vienna describes an operation of perforation of the penis among the Malays; and Jagor and Micklucho-Maclay report similar customs among the Dyaks and other natives of Borneo, Java, and Phillipine Islands.

Circumcision is a rite of great antiquity. The Bible furnishes frequent records of this subject, and the bas-reliefs on some of the old Egyptian ruins represent circumcised children. Labat has found traces of circumcision and excision of nymphæ in mummies. Herodotus remarks that the Egyptians practised circumcision rather as a sanitary measure than as a rite. Voltaire stated that the Hebrews borrowed circumcision from the Egyptians; but the Jews claimed that the Phœnicians borrowed this rite from the Israelites.

[a] 404, 346. [b] 701, 1878, 266. [c] 224, 1889, ii., 1315.

Spencer and others say that in the early history of the Christian religion, St. Paul and his Disciples did not believe in circumcision, while St. Peter and his followers practised it. Spencer mentions that the Abyssinians take a phallic trophy by circumcision from the enemy's dead body. In his "History of Circumcision," Remondino says that among the modern Berbers it is not unusual for a warrior to exhibit virile members of persons he has slain; he also says that, according to Bergman, the Israelites practised preputial mutilations; David brought 200 prepuces of the Philistines to Saul. Circumcision is practised in nearly every portion of the world, and by various races, sometimes being a civil as well as a religious custom. Its use in surgery is too well known to be discussed here. It might be mentioned, however, that Rake of Trinidad,[a] has performed circumcision 16 times, usually for phimosis due to leprous tuberculation of the prepuce. Circumcision, as practised on the clitoris in the female, is mentioned on page 308.

Ceremonial Ovariotomy.—In the writings of Strabonius and Alexander ab Alexandro, allusion is made to the liberties taken with the bodies of females by the ancient Egyptians and Lydians. Knott[b] says that ablation of the ovaries is a time-honored custom in India, and that he had the opportunity of physically examining some of the women who had been operated on in early life. At twenty-five he found them strong and muscular, their mammary glands wholly undeveloped, and the normal growth of pubic hairs absent. The pubic arch was narrow, and the vaginal orifice practically obliterated. The menses had never appeared, and there seemed to be no sexual desire. Micklucho-Maclay found that one of the most primitive of all existing races—the New Hollanders—practised ovariotomy for the utilitarian purpose of creating a supply of prostitutes, without the danger of burdening the population by unnecessary increase. MacGillibray found a native ovariotomized female at Cape York who had been subjected to the operation because, having been born dumb, she would be prevented from bearing dumb children,—a wise, though primitive, method of preventing social dependents.

Castration has long been practised, either **for the production of eunuchs, or castrata,** through vengeance or jealousy, for excessive cupidity, as a punishment for crime, in fanaticism, in ignorance, and as a surgical therapeutic measure (recently, for the relief of hypertrophied prostate). The custom is essentially Oriental in origin, and was particularly used in polygamous countries, where the mission of eunuchs was to guard the females of the harem. They were generally large, stout men, and were noted for their vigorous health. The history of eunuchism is lost in antiquity. The ancient Book of Job speaks of eunuchs, and they were in vogue before the time of Semiramis; the King of Lydia, Andramytis, is said to have sanctioned castration of both male and female for social reasons. Negro eunuchs were common among the Romans. All the great emperors

[a] 703, April, 1893. [b] 536, 1860, ii., 33.

and conquerors had their eunuchs. Alexander the Great had his celebrated eunuch, Bagoas, and Nero, his Sporus, etc. Chevers[266] says that the manufacture of eunuchs still takes place in the cities of Delhi, Lucknow, and Rajpootana. So skilful are the traveling eunuch-makers that their mortality is a small fraction of one per cent. Their method of operation is to encircle the external genital organs with a tight ligature, and then sweep them off at one stroke. He also remarks that those who retain their penises are of but little value or trusted. He divided the Indian eunuchs into three classes: those born so, those with a penis but no testicles, and those minus both testicles and penis. Curran[a] describes the traveling eunuch-makers in Central India, and remarks upon the absence of death after the operation, and invites the attention of gynecologists and operators to the successful, though crude, methods used. Curran says that, except those who are degraded by practices of sexual perversions, these individuals are vigorous bodily, shrewd, and sagacious, thus proving the ancient descriptions of them.

Jamieson[b] recites a description of the barbarous methods of making eunuchs in China. The operators follow a trade of eunuch-making, and keep it in their families from generation to generation; they receive the monetary equivalent of about $8.64 for the operation. The patient is grasped in a semi-prone position by an assistant, while two others hold the legs. After excision the wounded parts are bathed three times with a hot decoction of pepper-pods, the wound is covered with paper soaked in cold water, and bandages applied. Supported by two men the patient is kept walking for two or three hours and then tied down. For three days he is allowed nothing to drink, and is not allowed to pass his urine, the urethra being filled with a pewter plug. It generally takes about one hundred days for the wound to heal, and two per cent. of the cases are fatal. There is nocturnal incontinence of urine for a long time after the operation.

Examples of **castration because of excessive cupidity, etc.,**—a most unwarranted operation,—are quite rare and are usually found among ecclesiastics. The author of "Faustin, or le Siécle Philosophique," remarked that there were more than 4000 castrated individuals among the ecclesiastics and others of Italy. The virtuous Pope Clement XIV. forbade this practice, and describes it as a terrible abuse; but in spite of the declaration of the Pope the cities of Italy, for some time, still continued to contain great numbers of these victims. In France an article was inserted into the penal code providing severe punishment for such mutilations. Fortunately castration for the production of "castrata," or tenor singers, has almost fallen into disuse. Among the ancient Egyptians and Persians amputation of the virile member was inflicted for certain crimes of the nature of rape.

Castration as a religious rite has played a considerable rôle. With all their might the Emperors Constantine and Justinian opposed the delirious

[a] 655, April, 1886. [b] 476, 1877, ii., 123.

religion of the priests of Cybele, and rendered their offence equivalent to homicide. At the annual festivals of the Phrygian Goddess Amma (Agdistis) it was the custom of young men to make eunuchs of themselves with sharp shells, and a similar rite was recorded among Phœnicians. Brinton names severe self-mutilators of this nature among the ancient Mexican priests. Some of the Hottentots and indigenous Australians enforced semicastration about the age of eight or nine.

The Skoptzies, religious castrators in Russia, are possibly the most famous of the people of this description. The Russian government has condemned members of this heresy to hard labor in Siberia, but has been unable to extinguish the sect. Pelikan, Privy Counsel of the government, has exhaustively considered this subject. Articles have appeared in Le Progrès Médical, December, 1876, and there is an account in the St. Louis Clinical Record, 1877–78. The name Skoptzy means "the castrated," and they call themselves the "White Doves." They arose about 1757 from the Khlish or flagellants. Paul I. caused Sseliwanow, the true founder, to return from Siberia, and after seeing him had him confined in an insane asylum. After an interview, Alexander I. transferred him to a hospital. Later the Councillor of State, Jelansky, converted by Sseliwanow, set the man free, and soon the Skoptzies were all through Russia and even at the Court. The principal argument of these people is the nonconformity of orthodox believers, especially the priests, to the doctrines professed, and they contrast the lax morals of these persons with the chaste lives, the abstinence from liquor, and the continual fasts of the "White Doves." For the purpose of convincing novices of the Scriptural foundation of their rites and belief they are referred to Matthew xix., 12: "and there be eunuchs which have made themselves for the kingdom of Heaven's sake," etc.; and Mark ix., 43–47; Luke xxiii., 29: "blessed are the barren," etc., and others of this nature. As to the operation itself, pain is represented as voluntary martyrdom, and persecution as the struggle of the spirit of darkness with that of light. They got persons to join the order by monetary offers. Another method was to take into service young boys, who soon became lost to society, and lied with effrontery

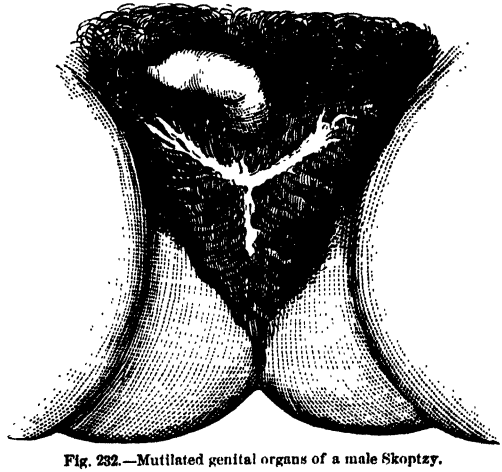


Fig. 232.—Mutilated genital organs of a male Skoptzy.

and obstinacy. They had secret methods of communicating with one another, and exhibited a passion for riches, a fact that possibly accounts for their extended influence. The most perfect were those "worthy of mounting the white horse," the "bearers of the Imperial seal," who were deprived of the testicles, penis, and scrotum. The operation of castration among these people was performed at one stroke or at two different times, in the former case one cicatrix being left, and in the latter two. The greater number—those who had submitted to the "first purification," conferring upon them the "lesser seal"—had lost testicles and scrotum. These people are said to have lost the "keys of hell," but to retain the "key of the abyss" (female genitals). As instruments of excision the hot iron, pieces of glass, old wire, sharpened bone, and old razors are used. Only nine fatal cases resulting from the operation are known. At St. Petersburg Liprandi knew a rich Skoptzy who constantly kept girls—mostly Germans—for his own gratification, soon after having entered into the "first purification." Few of them were able to remain with him over a year, and they always returned to their homes with health irretrievably lost. Women members of the order do not have their ovaries removed, but mutilation is practised upon the external genitals, the mammæ, and nipples. The first ablation is obtained by applying fire or caustics to the nipples, the second by amputation of the breasts, one or both, the third by diverse gashes, chiefly across the breast, and the fourth by resection of the nymphæ or of the nymphæ and clitoris, and the superior major labia, the cicatrices of which would deform the vulva. Figure 232 represents the appearance of the external genital organs of a male Skoptzy after mutilation; Figure 233 those of a female.[a]

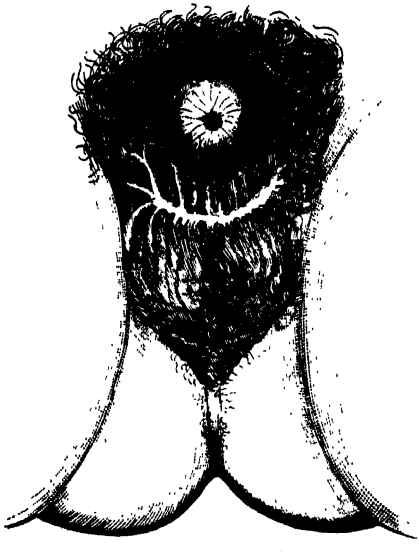


Fig. 233.—Mutilated genital organs of a female Skoptzy.

Battey[b] speaks of Skoptzies in Roumania who numbered at the time of report 533 persons. They came from Russia and practised the same ceremonies as the heretics there.

[a] 653, Dec. 23, 1876.

[b] 176, Dec., 1873, xi., 483.

CHAPTER XV.

ANOMALOUS TYPES AND INSTANCES OF DISEASE.

Tumors.—In discussing tumors and similar growths no attempt will be made to describe in detail the various types. Only the anomalous instances or examples, curious for their size and extent of involvement, will be mentioned. It would be a difficult matter to decide which was the largest tumor ever reported. In reviewing literature so many enormous growths are recorded that but few can be given here. Some of the large cystic formations have already been mentioned; these are among the largest tumors. Scrotal tumors are recorded that weighed over 200 pounds; and a limb affected with elephantiasis may attain an astonishing size. Delamater is accredited with a report of a tumor that weighed 275 pounds, the patient only weighing 100 pounds at death.[a] Benign tumors will be considered first.

Pure **adenoma of the breast** is a rare growth. Gross was able to collect but 18 examples; but closely allied to this condition is what is known as **diffuse hypertrophy of the breast.** In some parts of the world, particularly in India and Africa, long, dependant breasts are signs of beauty. On the other hand we learn from Juvenal and Martial that, like ourselves, the Greeks detested pendant and bulky breasts, the signs of beauty being elevation, smallness, and regularity of contour. In the Grecian images of Venus the breasts are never pictured as engorged or enlarged. The celebrated traveler Chardin says that the Circassian and Georgian women have the most beautiful breasts in the world; in fact the Georgians are so jealous of the regular contour and wide interval of separation of their breasts that they refuse to nourish their children in the natural manner.

The amount of hypertrophy which is sometimes seen in the mammæ is extraordinary. Borellus[841] remarks that he knew of a woman of ordinary size, each of whose mammæ weighed about 30 pounds, and she supported them in bags hung about her neck. Durston[b] reports a case of sudden onset of hypertrophy of the breast causing death. At the postmortem it was found that the left breast weighed 64 pounds and the right 40 pounds. Boyer successfully removed two breasts at an interval of twenty-six days between the two operations. The mass excised was one-third of the total body-weight.

[a] 331, 1862, iv., 214.

[b] 629, 1669.

Schaeffer[a] speaks of hypertrophied mammæ in a girl of fourteen, the right breast weighing 3900 grams (136½ oz.) and the right 3500 grams (122½ oz.). Hamilton[b] reports a case of hypertrophied glands in a woman of thirty-two, which, within the short space of a year, reached the combined weight of 52 pounds. They were successfully excised. Velpeau, Billroth, and Labarracque have reported instances of the removal of enormously hypertrophied mammæ. In 1886 Speth of Munich described a hypertrophy of the right breast which increased after every pregnancy. At the age of twenty-six the woman had been five times pregnant in the space of a little over five years, and at this time the right breast hung down to the anterior superior spine of the ilium. It weighed 20 pounds, and its greatest circumference was 25 inches. There was no milk in this breast, although the left was in perfect lactation. This case was one of pure hypertrophy and not an example of fibro-adenoma, as illustrated by Billroth. Warren figures a case of diffused hypertrophy of the breast which was operated on by Porter (Fig. 234). The right breast in its largest circumference measured 38 inches and from the chest-wall to the nipple was 17 inches long, the circumference at the base being 23 inches; the largest circumference of the left breast was 28 inches; its length from the chest-wall to the nipple was 14 inches, and its circumference at the base 23 inches. The skin was edematous and thickened. Throughout both breasts were to be felt hardened movable masses, the size of oranges. Microscopic examination showed the growth to be a diffused intracanalicular fibroma. A peculiar case was presented before the Faculty at Montpellier.[c] The patient was a young girl of fifteen and a half years. After a cold bath, just as the menses were appearing, it was found that the breasts were rapidly increasing in size; she was subsequently obliged to leave service on account of their increased size, and finally the deformity was so great as to compel her to keep from the public view. The circumference of the right breast was 94 cm. and of the left 105 cm.; the pedicle of the former measured 67 cm. and of the latter 69 cm.; only the slightest vestige of a nipple remained. Removal was advocated, as applications of iodin had failed; but she would not consent to opera-

Fig. 234.—Diffuse hypertrophy of the breast (Warren).

[a] 261, 1893. [b] 450, March 9, 1895. [c] 672, Nov. 11, 1878.

tion. For eight years the hypertrophy remained constant, but, despite this fact, she found a husband. After marriage the breasts diminished, but she was unable to suckle either of her three children, the breasts becoming turgid but never lactescent. The hypertrophy diminished to such a degree that, at the age of thirty-two, when again pregnant, the circumference of the right breast was only 27 cm. and of the left 33 cm. Even thus reduced the breasts descended almost to the navel. When the woman was not pregnant they were still less voluminous and seemed to consist of an immense mass of wrinkled, flaccid skin, traversed by enormous dilated and varicose blood-vessels, the mammary glands themselves being almost entirely absent.

Diffuse hypertrophy of the breast is occasionally seen in the male subject. In one case reported from the Westminster Hospital in London, a man of sixty, after a violent fall on the chest, suffered enormous enlargement of the mammæ, and afterward atrophy of the testicle and loss of sexual desire.

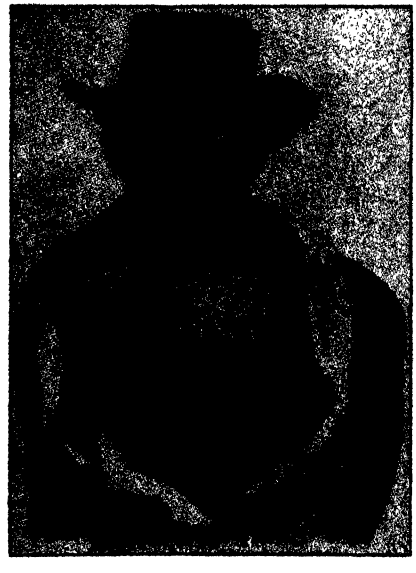


Fig. 235.—Cystic goiter (Warren).

The names **goiter, struma,** and **bronchocele** are applied indiscriminately to all tumors of the thyroid gland; there are, however, several distinct varieties among them that are true adenoma, which, therefore, deserves a place here. According to Warren,[a] Wölfler gives the following classification of thyroid tumors: 1. Hypertrophy of the thyroid gland, which is a comparatively rare disease; 2. Fetal adenoma, which is a formation of gland tissue from the remains of fetal structures in the gland; 3. Gelatinous or interacinous adenoma, which consists in an enlargement of the acini by an accumulation of colloid material, and an increase in the interacinous tissue by a growth of round cells. It is this latter form in which cysts are frequently found. The accompanying illustration (Fig. 235) pictures an extreme case of cystic goiter shown by Warren. A strange feature of tumors of the thyroid is that pressure-atrophy and flattening of the trachea do not take place in proportion to the size of the tumor. A small tumor of the middle lobe of the gland, not larger that a hen's egg, will do more damage to the trachea than will a large tumor, such as that shown by Senn,[b] after Bruns

[a] Surgical Pathology and Therapeutics, by J. C. Warren, Philadelphia, 1895.

[b] The Pathology and Surgical Treatment of Tumors, by N. Senn, Philadelphia, 1895.

(Fig. 236). When a tumor has attained this size, pressure-symptoms are often relieved by the weight of the tumor making traction away from the trachea. Goiter is endemic in some countries, particularly in Switzerland and Austria, and appears particularly at the age of childhood or of puberty. Some communities in this country using water containing an excess of calcium salt show distinct evidences of endemic goiter. **Extirpation of the thyroid** gland has in recent years been successfully practised. Warren has extirpated one lobe of the thyroid after preliminary ligation of the common carotid on the same side. Green practised rapid removal of the tumor and ligated the bleeding vessels later. Rose tied each vessel before cutting, proceeding slowly. Senn remarks that in 1878 he witnessed one of Rose's operations which lasted for four hours. Although the operatic technic of removal of the thyroid gland for tumor has been greatly perfected by Billroth, Lücke, Julliard, Reverdin, Socin, Kocher, and others, the current opinion at the present day seems to be that complete extirpation of the thyroid gland, except for malignant disease, is unjustifiable. Partial extirpation of the thyroid gland is still practised; and Wölfler has revived the operation of ligating the thyroid arteries in the treatment of tumors of the thyroid gland.

Fig. 236.—Enormous tumor of the thyroid gland (after Bruns).

Fibromata.—One of the commonest seats of fibroma is the skin. **Multiple fibromata of the skin** sometimes occur in enormous numbers and cover the whole surface of the body; they are often accompanied by pendulous tumors of enormous size. Virchow called such tumors fibroma molluscum. Figure 237 represents a case of multiple fibromata of the skin shown by Octerlony. Pode[a] mentions a somewhat similar case in a man of fifty-six, under the care of Thom. The man was pale and emaciated, with anxious expression, complaining of a tumor which he described as a "wishing-mark." On examination he was found to be covered with a number of small tumors, ranging in

[a] 476, May 11, 1890.

Fig. 237.—Fibromata (after Octerlony).

Fig. 238.—Fibroma molluscum (Pode).

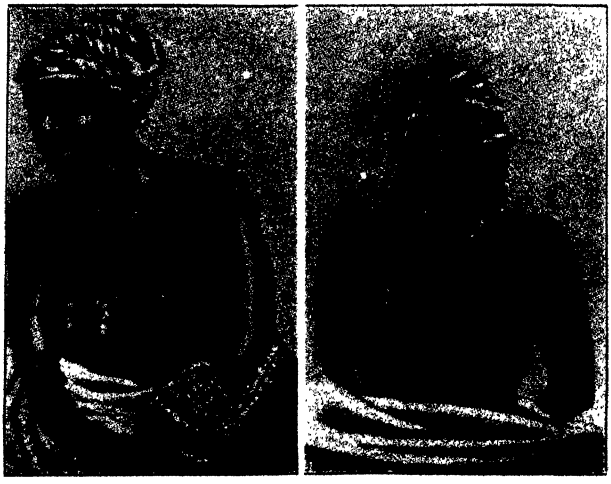


Fig. 239.—Multiple keloids (Collins).

size from that of a small orange to that of a pin's head; from the thoracic wall over the lower true ribs of the right side was situated a large pendulous tumor, which hung down as far as the upper third of the thigh (Fig. 238). He said that it had always been as long as this, but had lately become thicker, and two months previously the skin over the lower part of the tumor had ulcerated. This large tumor was successfully removed; it consisted of fibrous tissue, with large veins running in its substance. The excised mass weighed 5½ pounds. The patient made an early recovery.

Keloids are fibromata of the true skin, which may develop spontaneously or in a scar. Although the distinction of true and false keloid has been made, it is generally discarded. According to Hebra a true typical keloid is found once in every 2000 cases of skin-disease. It is, however, particularly the false keloid, or keloid arising from cicatrices, with which we have mostly to deal. This tumor may arise from a scar in any portion of the body, and at any age. There seems to be a disposition in certain families and individuals to keloid-formations, and among negroes keloids are quite common, and often of remarkable size and conformation. The form of injury causing the cicatrix is no factor in the production of keloid, the sting of an insect, the prick of a needle, and even the wearing of ear-rings having been frequent causes of keloid-formations among the negro race. Collins[a] describes a negress of ninety (Fig. 239), born of African parents, who exhibited multiple keloids produced by diverse injuries. At fourteen she was burned over her breasts by running against a shovelful of hot coals, and several months later small tumors appeared, which never suppurated. When a young girl a tumor was removed from the front of her neck by operation, and cicatricial tumors then spread like a band encircling one-half her neck. There were keloids over her scapulæ, which followed the application of blisters. On her back, over, and following the direction of the ribs, were growths attributed to the wounds caused by a flogging. This case was quite remarkable for the predisposition shown to keloid at an early age, and the variety of factors in causation.

About 1867 Duhring had under his observation at the Philadelphia Hospital a negro whose neck was encircled by enormous keloids, which, although black, otherwise resembled tomatoes. A photograph of this remarkable case (Fig. 240) was published in Philadelphia in 1870.[b]

A **lipoma** is a tumor consisting of adipose tissue. When there is much fibrous tissue in the tumor it is much firmer, and is known as a fibro-lipoma. Brander[c] describes a young native of Manchuria, North China, from whom he removed a fibro-lipoma weighing 50 pounds. The growth had progressively enlarged for eleven years, and at the time of extirpation hung as an enormous mass from beneath the left scapula. In operating the tumor had to be swung on a beam (Fig. 241). The hemorrhage was slight and the patient was discharged in five days.

[a] 792, Oct., 1889. [b] 631, 1870. [c] 224, March 17, 1894.

Fig. 240.—Enormous keloids of the neck (Duhring).

Fig. 241.—Large fibro-lipoma (Brander).

Fig. 242.—Diffuse lipoma of the neck and abdomen (Warren).

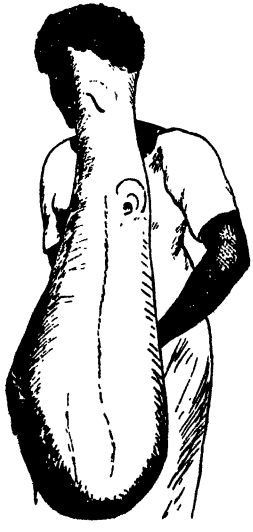


Fig. 243.—Enormous lipoma of the parietal region (Rotter).

The true lipoma must be distinguished from diffuse accumulations of fat in different parts of the body in the same way that fibroma is distinguished from elephantiasis. Circumscribed lipoma appears as a lobulated soft tumor, more or less movable, lying beneath the skin. It sometimes reaches enormous size and assumes the shape of a pendulous tumor.

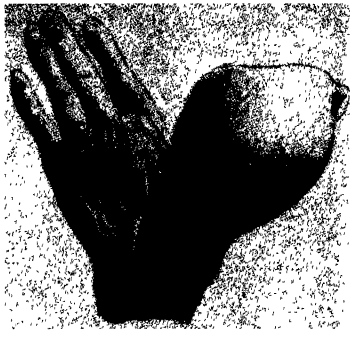


Fig. 244.—Enchondroma of the thumb (Warren).

Diffuse lipoma, occurring in the neck, often gives the patient a grotesque and peculiar appearance (Fig. 242). It is generally found in men addicted to the use of alcohol, and occurs between thirty-five and forty-five years of age; in no case has general obesity been described. In one of Madelung's cases a large lobe extended downward over the clavicle. The growth has been found between the larynx and the pharynx. Black[a] reports a remarkable case of fatty tumor in a child one year and five months old which filled the whole abdominal cavity, weighing nine pounds and two ounces. Chipault[b] mentions a case of lipoma of the parietal region, observed by Rotter. This monstrous growth (Fig. 243) was three feet three inches long, descending to the knees. It had its origin in the left parietal region, and was covered by the skin of the whole left side of the face and forehead. The left ear was plainly visible in the upper third of the growth.

Fig. 245.—Lad twenty years of age with multiple chondromata (after Steudel).

Chondroma, or enchondroma, is a cartilaginous tumor occurring princi-

[a] 298, 1878, i., 491.

[b] La Méd. Moderne, Dec. 11, 1895.

pally where cartilage is normally found, but sometimes in regions containing no cartilage. Enchondroma may be composed of osteoid tissue, such as is found in the ossifying callous between the bone and the periosteum, and, according to Virchow, then takes the name of osteochondroma. Virchow has divided chondromata into two forms—those which he calls ecchondromata, which grow from cartilage, and those that grow independently from cartilage, or the enchondromata, which latter are in the great majority. Enchondroma is often found on the long bones, and very frequently upon the bones of the hands or on the metatarsal bones.

Fig. 246.—Enormous fibroma growing from the parotid region.

Figure 244 represents an enchondroma of the thumb. Multiple enchondromata (Fig. 245) are most peculiar, and may attain enormous sizes. Whittaker[a] describes a farmer of forty who exhibited peculiar tumors of the fingers, which he calls multiple osteoecchondromata. His family history was negative. He stated that at an early age he received a stroke of lightning, which rendered him unconscious for some time. He knows of nothing else that could be in possible relation with his present condition. Nine months after this accident there was noticed an enlargement of the middle joint of the little finger, and about the same time an enlargement on the middle finger. Gradually all the joints of the right hand became involved. The enlargement increased so that at the age of twelve they were of the size of walnuts, and at this time the patient began to notice the same process developing in the left hand.

Fig. 247.—Hyaline enchondroma of the scapula (Warren).

[a] International Med. Magazine, Philadelphia, Feb., 1894.

The growths continued to develop, new nodules appearing, until the fingers presented the appearance of nodulated potatoes.

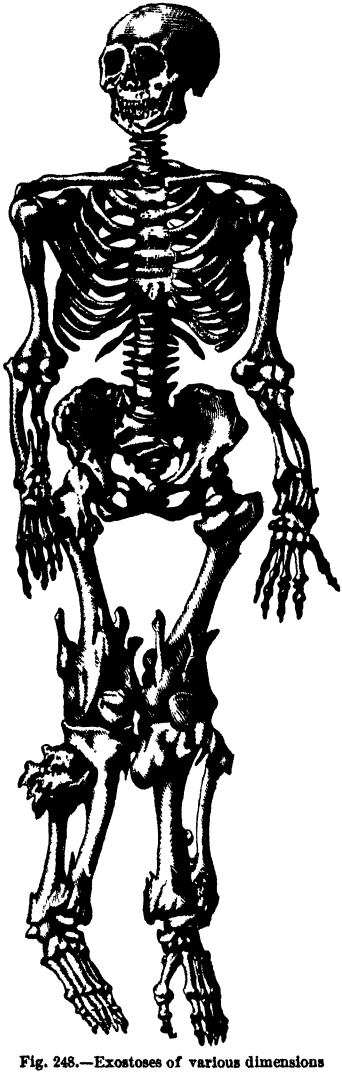


Fig. 248.—Exostoses of various dimensions (Pierret).

One of the most frequent of the fibro-cartilaginous tumors is the "mixed cartilaginous" tumor of Paget, which grows in the interstitial tissues of the parotid gland, and sometimes attains enormous size. Matas[a] presented the photograph of a negress having an enormous fibroma growing from the left parotid region (Fig. 246); and there is a photograph of a similar case in the Mütter Museum of the College of Physicians, Philadelphia.

The hyaline enchondroma is of slow growth, but may at times assume immense proportions, as is shown in the accompanying illustration (Fig. 247), given by Warren, of a patient in whom the growth was in the scapula.

In 1824 there is quoted[b] the description of a peculiar growth which, though not definitely described, may be spoken of here. It was an enormous encysted tumor, springing from the clavicle of a Veronese nobleman. Contrary to general expectations it was successfully removed by Portalupi, a surgeon of Venice. It weighed 57 pounds, being 20½ inches long and 30 inches in circumference. It is said this tumor followed the reception of a wound.

Among the **benign bone tumors** are **exostoses**—homologous outgrowths differing from hypertrophies, as they only involve a limited part of the circumference. When developmental, originating in childhood, the outgrowths may be found on any part of the skeleton, and upon many and generally symmetric parts at the same time, as is shown in Figure 248.

Barwell[c] had a case of a girl with 38 exostoses. Erichsen[d] mentions a young man of twenty-one with 15 groups of symmetric exostoses in various portions of the body; they were spongy or cancellous in nature.

[a] 593, Feb., 1894. [b] 476, 1824, 26. [c] 476, 1861, ii., 446. [d] 476, 1860.

Hartmann[a] shows two cases of multiple exostoses (Fig. 249), both in males, and universally distributed over the body.

Macland of the French navy[b] describes an affection of the bones of the

Fig. 249.—Multiple exostoses (Hartmann).

face known as **anakhrē** or **goundron** (gros-nez). It is so common that about one per cent. of the natives of certain villages on the Ivory Coast, West Africa, are subject to it. As a rule the earliest symptoms in childhood are: more or less persistent headache, particularly frontal, sanguineous and purulent discharge from the nostrils, and the formation of symmetric swellings the size of an almond in the region of the nasal processes of the superior maxilla. The cartilage does not seem to be involved, and, although it is not so stated, the nasal duct appears to remain intact. The headache and discharge continue for a year, and the swelling continually increases through life, although the symptoms gradually disappear, the

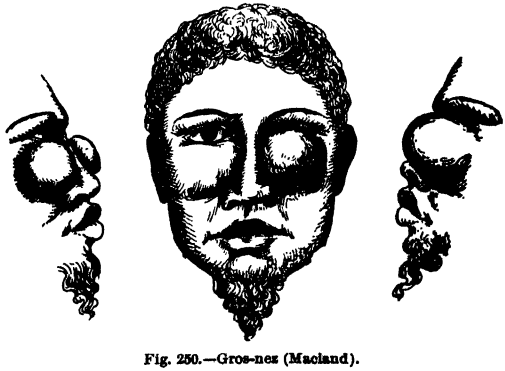


Fig. 250.—Gros-nez (Macland).

[a] Archiv für Klinische Chirurgie, Berlin, 1893. [b] Quoted 224, 1895, i., 1217.

skin not becoming involved, and no pain being present. It has been noticed in young chimpanzees. The illustration (Fig. 250) represents a man of forty who suffered from the disease since puberty. Pressure on the eyeball had started and the native said he expected that in two years he would lose his sight. Figure 251 shows an analogous condition, called by Hutchinson symmetric osteomata of the nasal processes of the maxilla. His patient was a native of Great Britain.

Fig. 251.—Symmetric osteomata of the nasal processes of the superior maxilla (after Hutchinson).

Among neuromata, **multiple neurofibroma** is of considerable interest, chiefly for the extent of general involvement. According to Senn, Heusinger records the case of a sailor of twenty-three in whom all the nerves were affected by numerous nodular enlargements. Not a nerve in the entire body was found normal. The enlargement was caused by increase in the connective tissue, the axis-cylinders being normal. In this case there was neither pain nor tenderness. Prudden reports the case of a girl of twenty-five who, during convalescence from variola, became paraplegic, and during this time multiple neuromata appeared. At the postmortem more than a thousand tumors were found affecting not only the peripheral branches and the sympathetic, but also the cranial nerves and the pneumogastric. Under the microscope these tumors showed an increase in the interfascicular as well as perivascular fibers, but the nerve-fibers were not increased in size

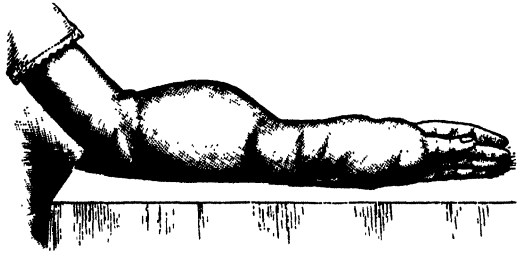


Fig. 252.—Arm in which the musculo-spiral nerve was neuromatous (after Campbell de Morgan).

or number. Virchow collected 30 cases of multiple neurofibromata. In one case he found 500, in another from 800 to 1000 tumors.

Plexiform neuroma is always congenital, and is found most frequently in the temporal region, the neck, and the sides of the face, but almost any part of the body may be affected. Christôt reports two cases in which the

tumors were located upon the cheek and the neck. Czerny observed a case in which the tumor involved the lumbar plexus. Quoted by Senn, Campbell de Morgan met with a plexiform neuroma of the musculo-spiral nerve and its branches (Fig. 252). The patient was a young lady, and the tumor, which was not painful, had undergone myxomatous degeneration.

Neuroma of the vulva is a pathologic curiosity. Simpson reports a case

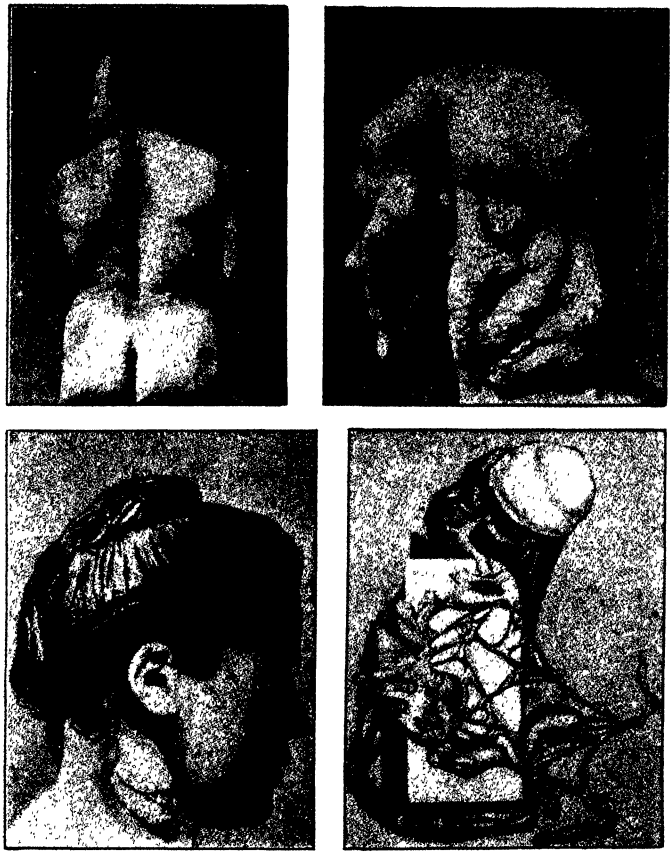


Fig. 253.—Plexiform neurofibroma (Tietze).

in which the tumor was a painful nodule situated near the urinary meatus. Kennedy mentions an instance in which the tumor appeared as extremely tender tubercles.

Tietze[a] describes a woman of twenty-seven who exhibited a marked type of plexiform neurofibroma (Fig. 253). The growth was simply excised and recovery was promptly effected.

[a] Archiv für klinische Chirurgie, Berlin, 1893.

Carcinomatous growths, if left to themselves, make formidable devastations of the parts which they affect. Warren pictures a case of noli-me-tangere, a destructive type of epithelial carcinoma (Fig. 254). The patient suffered no enlargement of the lymphatic glands. The same absence of glandular involvement was observed in another individual, in whom there was extensive ulceration. The disease had in this case originated in the scar of a gunshot wound received during the Civil War, and had destroyed the side of the nose, the eye, the ear, the cheek, including the corresponding half of the upper and lower lips.

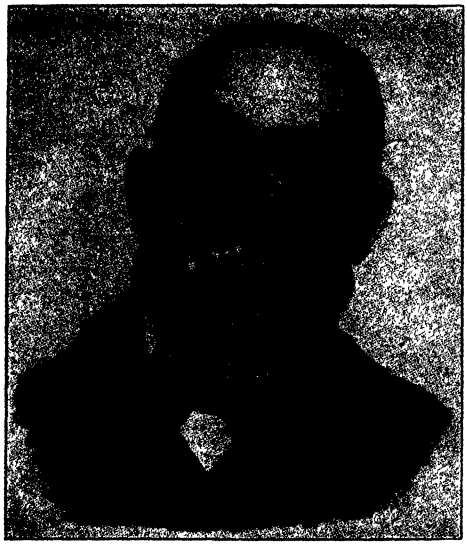


Fig. 254.—Noli-me-tangere (Warren).

Harlan[a] reports a most extraordinary epithelioma of the orbit in a boy of about five years (Plate 9). It followed enucleation, and attained the size depicted in a few months.

Sarcomata, if allowed full progress, may attain great size. Plate 10 shows an enormous sarcoma of the buttocks in an adult negro. Fascial sarcomata are often seen of immense size. Senn shows a tumor of this variety which was situated between the scapulæ.

Schwimmer records a curious case of universal small sarcomata over the whole body of a teacher of the age of twenty-one, in the Hungarian lowlands. The author called the disease sarcomata pigmentosum diffusum multiplex.

Fig. 255.—Deformity produced by a sarcoma of the nasal septum (after Moore).

The bones are a common seat of sarcomatous growths, the tumor in this instance being called **osteosarcoma.** It may affect any bone, but rarely involves an articulation; at times it skips the joint and goes to the neighboring bone.

[a] 765, May 18, 1894.

PLATE 9.

Epithelioma of the orbit (Harlan).

PLATE 10.

Enormous sarcoma of buttock (Keen and White).

A case of nasal sarcoma is shown by Moore (Fig. 255). The tumor was located in the nasal septum, and caused a frightful deformity In this case pain was absent, the sense of smell was lost, and the sight of the right eye impaired. Moore attempted to remove the tumor, but in consequence of some interference of respiration the patient died on the table.

Tiffany[a] reports several interesting instances of sarcoma, one in a white female of nineteen following a contusion of tibia. The growth had all the clinical history of an osteosarcoma of the tibia, and was amputated and photographed after removal (Fig. 256). In another case, in a white male of

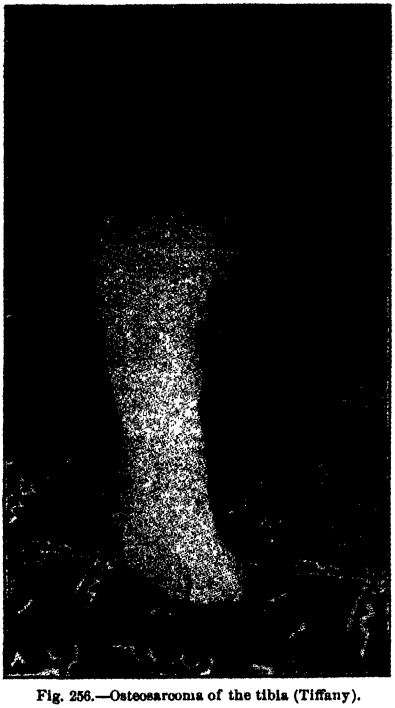


Fig. 256.—Osteosarcoma of the tibia (Tiffany).

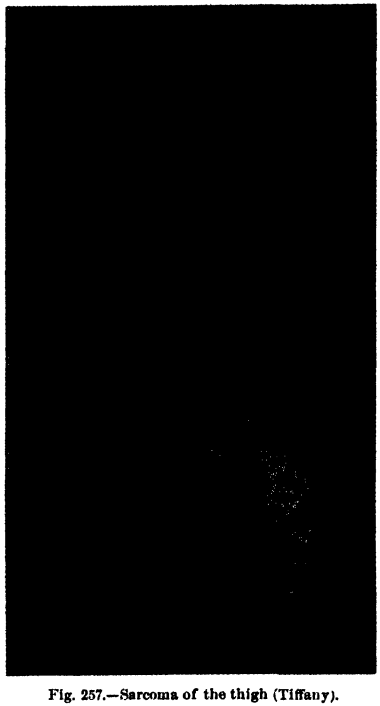


Fig. 257.—Sarcoma of the thigh (Tiffany).

thirty, the same author successfully performed a hip-amputation for a large sarcoma of the left femur. The removed member was sent entire to the Army Medical Museum at Washington (Fig. 257).

The fatality and incurability of malignant growths has done much to stimulate daring and marvelous operations in surgery. The utter hopelessness of the case justifies almost any means of relief, and many of the visceral operations, resections of functional organs, and extraordinary amputations that were never dreamed of in the early history of medicine are to-day not only feasible and justifiable, but even peremptorily demanded.

[a] International Med. Magazine, Philadelphia, May, 1892.

Varicose veins sometimes become so enlarged and distorted as to simulate the appearance of one varicose tumor. Adams[a] describes a curious case of congenital dilatation of the arteries and veins in the right lower limb, accompanied by an anastomosis with the interior of the os calcis. The affected thigh exceeded the other in size by one-third, all the veins being immensely swelled and distorted. The arteries were also distorted and could be felt pulsating all over the limb. The patient died at thirty from rupture of the aneurysm.

Fig. 258.—Aneurysmal varix of hand (Abbe).

Abbe[b] shows a peculiar **aneurysmal varix** of the finger in a boy of nine (Fig. 258). When a babe the patient had, on the dorsum of the little finger, a small nevus, which was quiescent for many years. He received a deep cut at the base of the thumb, and immediately after this accident the nevus began to enlarge rapidly. But for the local aneurysmal thrill at the point of the scar the condition would have been diagnosed as angioma, but as a bruit could be heard over the entire mass it was called an aneurysmal varix, because it was believed there was a connection between a rather large artery and a vein close to the mass. There is a curious case reported[c] of cirsoid tumor of the ear of a boy of thirteen. Figure 259 shows the appearance before and after operation.

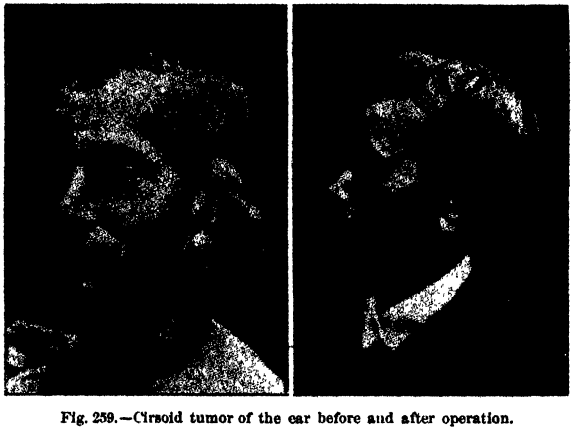


Fig. 259.—Cirsoid tumor of the ear before and after operation.

[a] 491, 1858, i., 189. [b] 150, March, 1894. [c] Rev. méd. de la Suisse Rom., Nov. 20, 1892.

Jessop[a] records a remarkable case of **multiple aneurysm.** This case was particularly interesting as it was accompanied by a postmortem examination. Pye-Smith[b] reports an extremely interesting case in which death occurred from traumatic aneurysm of an aberrant subclavian artery. The patient fell from a height of 28 feet, lost consciousness for a few minutes, but soon recovered it. There was no evidence of any fracture, but the man suffered greatly from dyspnea, pain between the shoulders, and collapse. The breath-sounds on auscultation and the difficulty in swallowing led to the belief that one of the bronchi was blocked by the pressure of a hematoma. Dyspnea continued to increase, and eighteen days after admission the man was in great distress, very little air entering the chest. He had no pulse at the right wrist, and Pye-Smith was unable to feel either the temporal or carotid beats on the right side, although these vessels were felt pulsating on the left side. Laryngotomy was done with the hope of removing a foreign body, but the man died on the tenth day. A postmortem examination disclosed the existence of an aberrant right subclavian artery in the posterior mediastinum, and this was the seat of a traumatic aneurysm that had ruptured into the esophagus.

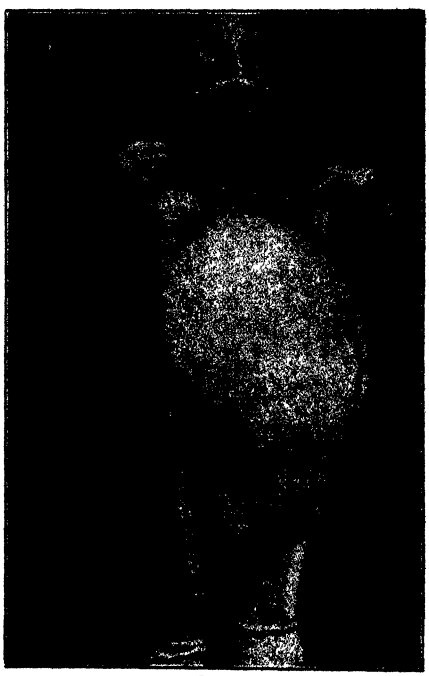


Fig. 260.—Enormous uterine tumor (McIntyre).

Relative to the **size of an aneurysm,** Warren[c] reported a case of the abdominal aorta which commenced at the origin of the celiac axis and passed on to the surfaces of the psoas and iliac muscles, descending to the middle of the thigh. The total length of the aneurysm was 19 inches, and it measured 18 inches in circumference.

A peculiar **sequence of an aortic aneurysm** is perforation of the sternum or rib. Webb[d] mentions an Irish woman who died of aneurysm of the aorta, which had perforated the sternum, the orifice being plugged by a large clot. He quotes 17 similar cases which he has collected as occurring from

[a] 476, November 17, 1894. [b] Quarterly Medical Journal, April, 1895.
[c] New England Q. J. Med. and Sc., Boston, 1842–43, i., 256. [d] 124, Oct., 1894.

1749 to 1874, and notes that one of the patients lived seven weeks after the rupture of the aneurysmal sac.

Large Uterine Tumors.—Before the meeting of the American Medical Association held in Washington, D. C., 1891, McIntyre[a] reported a case of great interest. The patient, a woman of thirty-eight, five feet 5½ inches in height, coarse, with masculine features, having hair on her upper lip and chin, and weighing 199½ pounds, was found in a poor-house in Trenton, Missouri, on November 26, 1890, suffering from a colossal growth of the abdomen. The accompanying illustration is from a photograph which was taken at the time of the first interview (Fig. 260). The measurements made at the time were as follows: circumference at the largest part, just below the umbilicus, 50 inches; circumference just below the mammæ, 35 inches; from the xiphoid cartilage to the symphysis pubis, 32 inches, not including the appendum, which is shown in the picture. Percussion suggested a fluid within a sac. The uterus was drawn up to the extent of from 12 to 14 inches. The woman walked with great difficulty and with a waddling gait, bending far backward the better to keep "the center of gravity within the base," and to enable her to sustain the enormous weight of the abdomen. She was compelled to pass her urine while standing. Attempts had been made six and two years before to tap this woman, but only a few drops of blood followed several thrusts of a large trocar. A diagnosis was made of multilocular ovarian cyst or edematous myoma of the uterus, and on the morning of December 7, 1890, an operation was performed. An incision 14 inches in length was first made in the linea alba, below the umbilicus, and afterward extended up to the xiphoid cartilage. The hemorrhage from the abdominal wall was very free, and the enormously distended vessels required the application of a

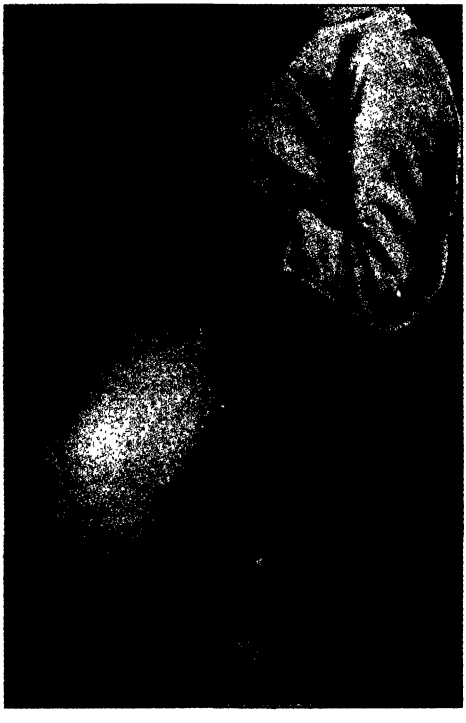


Fig. 261.—Uterine fibroma (Eastman).

[a] Western Medical Journal, Fort Scott, Kan., Jan., 1894.

large number of pressure-forceps. Adhesions were found almost everywhere, the most difficult to manage being those of the liver and diaphragm. The broad ligaments and Fallopian tubes were ligated on either side, the tumor turned out, the thick, heavy pedicle transfixed and ligated, and the enormous growth cut away. After operation the woman was immediately placed on platform scales, and it was found that she had lost 93½ pounds. Unfortunately the patient developed symptoms of septicemia and died on the fifth day. In looking over the literature on this subject McIntyre found no mention of any solid tumor of this size having been removed. On April 18, 1881, Keith, late of Edinburgh, now of London, successfully removed an edematous myoma, together with the uterus, which was 42 pounds in weight. In a recent work Tait [a] remarks that the largest uterine myoma which he ever removed weighed 68 pounds, and adds that it grew after the menopause. McIntyre believes that his tumor, weighing 93½ pounds, is the largest yet reported. Eastman [b] reports the removal of a fibroid tumor of the uterus weighing 60 pounds. The patient recovered from the operation (Fig. 261).

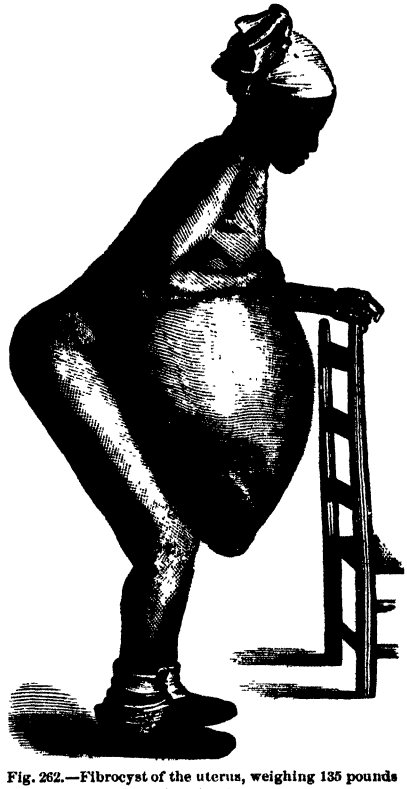


Fig. 262.—Fibrocyst of the uterus, weighing 135 pounds (Stockard).

It is quite possible for a **fibrocyst of the uterus** to attain an enormous size, equaling the ovarian cysts. Stockard [c] describes an instance of this nature in a negress of fifty, the mother of several children. About twelve years before a cyst in the right iliac region was tapped. The woman presented the following appearance (Fig. 262): The navel hung below her knees, and the skin near the umbilicus resembled that of an elephant. The abdomen in its largest circumference measured 68 inches, and 27 inches from the ensiform cartilage to the umbilicus. The umbilicus was five inches in diameter and three inches in length. Eight gallons and seven pints of fluid were removed by tapping, much remaining. The whole tumor weighed 135 pounds. Death from exhaustion followed on the sixth day after the tapping.

[a] "Diseases of Women and Abdominal Surgery," i., 187.

[b] No. Amer. Pract., Sept., 1893, 387.

[c] 538, Aug. 16, 1884.

Ovarian cysts, of which by far the greater number are of the glandular variety, form extremely large tumors; ovarian dropsies of enormous dimensions are recorded repeatedly throughout medical literature. Among the older writers Ford [a] mentions an instance of ovarian dropsy from which, by repeated operations, 2786 pints of water were drawn. Martineau [b] describes a remarkable case of twenty-five years' duration, in which 80 paracenteses were performed and 6630 pints of fluid were withdrawn. In one year alone 495 pints were withdrawn. Tozzetti [c] mentions an ovarian tumor weighing

Fig. 263.—Large ovarian cyst, weighing 149 pounds (N. Y. Med. Journal).

150 pounds. Morand [575] speaks of an ovarian cyst from which, in ten months, 427 pounds of fluid were withdrawn. There are old records of tubal cysts weighing over 100 pounds. Normand [d] speaks of an ovary degenerating into a scirrhous mass weighing 55 pounds. Among recent operations Briddon [e] describes the removal of an ovarian cyst which weighed 152 pounds, death resulting. Helmuth [f] mentions an ovarian cyst from which, in 12 tappings,

[a] 524, ii., No. 14.
[b] 629, 1748, 471.
[c] Raccolta, prima et cet., No. 1.
[d] 463, T. xviii., 360.
[e] 597, Feb. 8, 1890.
[f] Homœopath. Jour. of Obstet., N. Y., 1884-85.

559 pounds of fluid were withdrawn. Delivery was effected by instrumental aid. The tumor of 70 pounds was removed and death followed. McGillicuddy[a] mentions a case of ovarian cyst containing 132 pounds of fluid. The patient was a woman of twenty-eight whose abdomen at the umbilicus measured 69 inches in circumference and 47 inches from the sternum to the pubes. Before the operation the great tumor hung down as far as the knees, the abdominal wall chafing the thighs. Figure 263 shows the appearance of a large ovarian cyst weighing 149 pounds. The emaciation of the subject is particularly noticeable. Reifsnyder[b] describes a native Chinese woman affected with an ovarian tumor seen at the Margaret Williamson Hospital at Shanghai. She was four feet eight inches in height, and twenty-five years of age. The tumor had been growing for six years until the circumference at the umbilicus measured five feet 7¾ inches; 88 quarts of fluid were drawn off and the woman recovered. In the College of Physicians, Philadelphia, there are photographs (Figs. 264 and 265) of this case, with an inscription saying that the patient was a young Chinese woman who measured but four feet eight inches in height, while her girth was increased by an ovarian cyst to five feet 9⅛ inches. The tumor was removed and weighed 182½ pounds; it contained 22 gallons of fluid. Figure 265 shows the appearance of the woman two months after the operation, when the girth was reduced to normal. Stone[c] performed ovariotomy on a girl of fifteen, removing a tumor weighing 81½ pounds. Ranney[d] speaks of the successful removal of a unilocular tumor weighing 95 pounds; and Wall[e] tells of a death after removal of an ovarian tumor of the same weight. Rodenstein[f] portrays (Fig. 266) the appearance of a patient of forty-five after death from an enormous glandular ovarian cystoma. The tumor was three feet high, covered the breasts, extended to the knees, and weighed 146 pounds. Kelly speaks of a cyst weighing 116 pounds; Keith[g] one of 89½ pounds; Gregory,[h] 80 pounds; Boerstler,[i] 65 pounds; Bixby,[j] 70 pounds; and Alston[k] a tumor of 70 pounds removed in the second operation of ovariotomy.

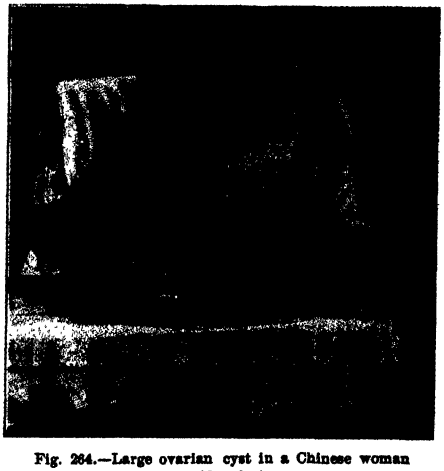


Fig. 264.—Large ovarian cyst in a Chinese woman (Reifsnyder).

[a] 121, April, 1825. [b] 125, April, 1895. [c] 606, 1883. [d] 450, 1884.
[e] 230, 1878. [f] 125, 1879, xii., 315. [g] 318, 1885. [h] 703, 1879.
[i] 609, 1885. [j] 218, 1882. [k] 667, 1871.

Dayot[a] reports the removal of an enormous ovarian cyst from a girl of seventeen. The tumor had been present three years, but the patient and her family refused an operation until the size of the tumor alarmed them. Its largest circumference was five feet 11 inches. The distance from the xiphoid to the symphysis pubis was three feet. The tumor was covered with veins the size of the little finger (Fig. 267). The apex of the heart was pushed to the 3d interspace and the umbilicus had disappeared. There were 65 quarts of a thick, brown fluid in the tumor. The patient recovered in twenty-five days.

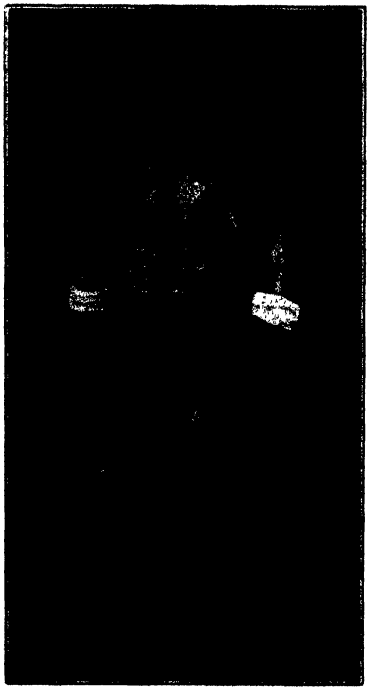


Fig. 265.—Same woman two months after operation.

Cullingworth[b] of St. Thomas Hospital, London, successfully removed from a girl of sixteen an ovarian cyst weighing over 80 pounds. The patient was admitted to the hospital April 30, 1895. She gave a history of a single menstruation, which took place in March or April, 1893, and said that in the latter month she noticed that she was growing large. She was tapped at Christmas, 1893, when a large quantity of fluid was removed, and again in February, 1894, and a third time in May, 1894, but without useful results. For the previous six months she had been almost entirely bedridden because of the great size of the tumor. There were no symptoms referring to the bladder and rectum. At the time she entered the hospital she was much emaciated, the eyes were sunken, and her cheeks had a livid hue. The chest was thin and the lower ribs were everted; dulness began at the lower border of the 3d cartilage, and the apex-beat was best felt in the third space. Liver-dulness began at the 4th rib cartilage in the nipple line. The abdomen was enormously distended, and covered by large veins running from below upward to the thorax. About 3½ inches above the umbilicus there was a sulcus with its convexity downward. There was dulness over the whole abdomen, except at the sides parallel with the lumbar spines, and a resonant band over the stomach. The greatest girth was 54½ inches. By vaginal examination the cervix was found to be pulled up and obliterated; the anterior vaginal wall was bulged downward by the tumor. On May 3d

[a] 164, Sept., 1893; quoted 124, 1894, xxix, 710. [b] 476, June 1, 1895.

abdominal section was performed. An incision eight inches long was made in the mid-line of the abdomen. A cystic tumor, formed of small cysts in its upper part and of somewhat larger ones in the lower part, was revealed. It was adherent to the abdominal wall, liver, spleen, and omentum. The adhesions were separated and the cyst tapped with a large trocar, and then the

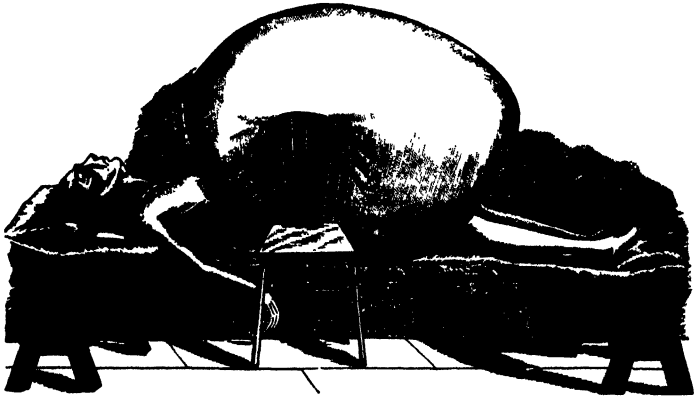


Fig. 266.—Enormous glandular ovarian cystoma (Rodenstein).

septa between the cysts were broken down with the fingers. The pedicle was rather small and was tied in the usual way, and the tumor was removed. Its seat of origin was the left ovary. The right ovary and the uterus were healthy, but poorly developed. The tumor weighed between 80 and 90 pounds.—the

Fig. 267.—Large ovarian cyst in a girl of seventeen (Dayot).

patient having weighed 170 pounds on the night before the operation, and 79½ pounds a week after the operation. Alarming symptoms of collapse were present during the night after the operation, but the patient responded to stimulation by hypodermic injections of $\frac{1}{20}$ grain of strychnin and of brandy, and after the first twenty-four hours the recovery was unin-

terrupted. Cullingworth thinks that the most interesting points in the case are: the age of the patient, the enormous size of the tumor, and the advice given by the surgeon who first attended the patient (insisting that no operation should be performed). This case shows anew the uselessness of tapping ovarian cysts.

In the records of **enormous dropsies** much material of interest is to be found, and a few of the most interesting cases on record will be cited. In the older times, when the knowledge of the etiology and pathology of dropsies was obscure, we find the records of the most extraordinary cases. Before the Royal Society, in 1746, Glass of Oxford [a] read the report of a case of preternatural size of the abdomen, and stated that the dropsy was due to the absence of one kidney. The circumference of the abdomen was six feet four inches, and the distance from the xiphoid to the os pubis measured four feet ½ inch. In this remarkable case 30 gallons of fluid were drawn off from the abdomen after death. Bartholinus [b] mentions a dropsy of 120 pounds; and Gockelius one of 180 pounds; there is recorded [c] an instance of a dropsy of 149 pounds. There is an old record [d] of a woman of fifty who had suffered from ascites for thirty years. She had been punctured 154 times, and each time about 20 pints were drawn off. During each of two pregnancies she was punctured three or four times; one of her children was still living. It has been said [462] that there was a case in Paris of a person who was punctured 300 times for ascites. Scott [e] reports a case of ascites in which 928 pints of water were drawn off in 24 successive tappings, from February, 1777, to May, 1778. Quoted by Hufeland, Van Wy mentions 1256 pounds of fluid being drawn from the abdomen of a woman in five years. Kaltschmid [f] describes a case of ascites in which, in 12 paracenteses, 500 pounds of fluid were removed. In 1721 Morand reported two cases of ascites in one of which, by the means of 57 paracenteses, 970 pounds of fluid were drawn off in twenty-two months. In the other case 1708 pounds of fluid issued in ten months. There is a record of 484 pounds of "pus" being discharged during a dropsy.[g]

The Philosophical Transactions contain the account of a case of **hydronephrosis** in which there were 240 pounds of water in the sac. There are several cases on record in which ovarian dropsies have weighed over 100 pounds; and Blanchard mentions a uterine dropsy of 80 pounds.

The Ephemerides contains an account of a case of **hydrocephalus** in which there were 24 pounds of fluid, and similar cases have been noted.

Elliotson [h] reports what he calls the largest quantity of pus from the liver on record. His patient was a man of thirty-eight, a victim of **hydatid disease of the liver,** from whom he withdrew one gallon of offensive material.

[a] 629, 1743–50, 1030. [b] 110, i., obs., viii. [c] 282, 1731, 227.
[d] Bull. des Sciences Méd. Depart. de l'Eure. [e] 534, 1779, 440.
[f] 282, 1738, 361. [g] 452, Band iv., 601. [h] 476, 1831–32, i., 756.

Lieutaud cites a case, reported by Blanchard,[213] in which, in a case of hydatid disease, the stomach contained 90 pounds of fluid.

Ankylosis of the articulations, a rare and curious anomaly, has been seen in the human fetus by Richaud, Joulin, Bird, and Becourt. Ankylosis of all the joints, with muscular atrophy, gives rise to a condition that has been popularly termed "**ossified man.**" A case of this nature is described,[a] the patient being a raftsman, aged seventeen, who suffered with inflammatory symptoms of the right great toe, which were followed in the next ten years by progressive involvement of all the joints of the extremities, and of the vertebræ and temporomaxillary articulations, with accompanying signs of acute articular rheumatism. At the age of thirty-one the pains had subsided, leaving him completely disabled. All the joints except the fingers and toes had become ankylosed, and from nonusage the muscles had atrophied (Fig. 268). There were no dislocations, anesthesia, or bedsores, and the viscera were normal; there were apparently no gouty deposits, as an examination of the urine was negative.

Fig. 268.—Ossified man (front and side views).

J. R. Bass, the well-known "ossified man" of the dime museums, has been examined by many physicians, and was quite intelligent and cheerful in spite of his complete ankylosis. Figure 269 represents his appearance in 1887.

Percy[b] speaks of a man named Simoore, born in 1752, who at the age of

Fig. 269.—J. R. Bass, the "ossified man."

fifteen was afflicted with ankylosis of all the joints, and at different angles. He was unable to move even his jaw, and his teeth had to be extracted in order to supply him with nourishment. Even his ribs were ankylosed; his chest

[a] International Jour. of Surg., Feb., 1889.

[b] 302, iv., 245.

puffed up, and the breathing was entirely abdominal. In spite of his infirmities, after his pains had ceased he lived a comparatively comfortable life. His digestion was good, and his excretory functions were sufficient. The urine always showed phosphates, and never the slightest sign of free phosphoric acid. He still retained his sexual feeling, and occasionally had erections. This man died in 1802 at the age of fifty, asphyxia being the precursor of death. His skeleton was deposited in the Museum of the École de Médecine de Paris. In the same Museum there was another similar skeleton, but in this subject there was motion of the head upon the first vertebra, the lower jaw was intact, and the clavicle, arms, and some of the digits of the right hand were movable.

An ossified man has been recently found and exhibited to the Paris Academy of Medicine. He is a Roumanian Jew of thirty who began to ossify twelve years ago, first up the right side of his back, then down the left side. He has hardened now to the nape of the neck, his head is turned to the left, and the jaws are ankylosed. He can still move his arms and legs a little with great difficulty.

Akin to the foregoing condition is what is known as **petrifaction or ossification** of portions of the living human body other than the articulations. Of the older writers Hellwigius,[414] Horstius,[423] and Schurig[a] speak of petrifaction of the arm. In the Philosophical Transactions there was a case recorded in which the muscles and ligaments were so extensively converted into bone that all the joints were fixed, even including the vertebræ, head, and lower jaw. In a short time this man was, as it were, one single bone from his head to his knees, the only joints movable being the right wrist and knee. For over a century there has been in the Trinity College at Dublin the skeleton of a man who died about 20 miles from the city of Cork. The muscles about the scapula, and the dorsum of the ilium (the glutei) were converted into great masses of bone, equal to the original muscles in thickness and bulk. Half of the muscles of the hips and thighs were converted into bone, and for a long time this specimen was the leading curiosity of the Dublin Museum.[b] In the Isle of Man, some years ago, there was a case of ossification which continued progressively for many years. Before death this man was reduced to almost a solid mass of bony substance. With the exception of one or two toes his entire frame was solidified. He was buried in Kirk Andreas Churchyard, and his grave was strictly guarded against medical men by his friends, but the body was finally secured and taken to Dublin by Dr. McCartney.[c]

Calculi.—In reviewing the statistics of **vesical calculi,** the strangest anomalies in their size and weight have been noticed. Among the older writers the largest weights have been found. Le Cat speaks of a calculus weighing over three pounds, and Morand is accredited with having seen a

[a] "Lithologia," p. 69. [b] 548, 1861, ii., 470. [c] 548, 1861, ii., 392.

calculus which weighed six pounds. In his statistics in 1883 Cross collected reports on 704 stones, and remarked that only nine of these weighed above four ounces, and only two above six, and that with the last two the patient succumbed. Of those removed successfully Harmer of Norwich reports one of 15 ounces; Kline, one of 13 ounces 30 grains; Mayo of Winchester, 14 ounces two drams; Cheselden, 12 ounces; and Paré in 1570 removed a calculus weighing nine ounces. Sir Astley Cooper remarks that the largest stone he ever saw weighed four ounces, and that the patient died within four hours after its removal. Before the Royal Society of London in 1684 Birch reported an account of a calculus weighing five ounces. Fabricius Hildanus mentions calculi weighing 20 and 21 ounces; Camper, 13 ounces; Foschini, 19 ounces six drams; Garmannus, 25 ounces; Greenfield, 19 ounces; Heberden,[a] 32 ounces; Wrisberg, 20 ounces; Launai,[b] 51 ounces; Lemery,[418] 27 ounces; Paget, in Kuhn's Journal, 27 ounces (from a woman); Pauli, 19 ounces; Rudolphi, 28 ounces; Tozzetti, 39 ounces; Threpland, 35 ounces; and there is a record of a calculus weighing over six pounds.[c] There is preserved in Trinity College, Cambridge, a stone weighing 34 ounces taken from the bladder of the wife of Thomas Raisin, by Gutteridge, a surgeon of Norwich. This stone was afterward sent to King Charles II. for inspection. In his "Journey to Paris" Dr. Lister said that he saw a stone which weighed 51 ounces; it had been taken from one of the religious brothers in June, 1690, and placed in the Hôpital de la Charité. It was said that the monk died after the operation. There is a record of[d] a calculus taken from the bladder of an individual living in Aberdeen. This stone weighed two pounds, three ounces, and six drams. In the Hunterian Museum in London there is a stone weighing 44 ounces, and measuring 16 inches in circumference. By suprapubic operation Duguise removed a stone weighing 31 ounces from a patient who survived six days. A Belgian surgeon by the name of Uytterhoeven,[174] by the suprapubic method extracted a concretion weighing two pounds and measuring 6½ inches long and four wide. Frére Côme performed a high operation on a patient who died the next day after the removal of a 24-ounce calculus. Verduc mentions a calculus weighing three pounds three ounces. It was said that a vesical calculus was seen in a dead boy at St. Edmund's which was as large as the head of a new-born child. It has been remarked that Thomas Adams, Lord Mayor of London, who died at the age of eighty-two, had in his bladder at the time of his death a stone which filled the whole cavity, and which was grooved from the ureters to the urethral opening, thus allowing the passage of urine. Recent records of large calculi are offered: by Holmes, 25 ounces; Hunter,[e] 25 ounces; Cayley,[f] 29 ounces; Humphrys,[g] 33 ounces; Eve, 44 ounces; and Janeway,[h] 51 ounces. Kirby[i] has collected reports of a number of large vesical calculi.

[a] 629, li.
[b] 398, i., 548.
[c] 232, 1739.
[d] 629, 1700, 150.
[e] 476, 1886, i., 132.
[f] 476, 1885, i., 559.
[g] 476, 1885, ii., 146.
[h] 597, 1877, xxvi., 210.
[i] 792, April, 1896.

Barton [a] speaks of **stone** in the bladder **in very young children.** There is a record of a stone at one month,[b] and another at three years.[c] Todd [d] describes a stone in the bladder of a child of sixteen months. May [e] removed an enormous stone from a young girl, which had its nucleus in a brass penholder over three inches long.

Multiple Vesical Calculi.—Usually the bladder contains a single calculus, but in a few instances a large number of stones have been found to coexist. According to Ashhurst, the most remarkable case on record is that of the aged Chief Justice Marshal, from whose bladder Dr. Physick of Philadelphia is said to have successfully removed by lateral lithotomy more than 1000 calculi. Macgregor mentions a case in which 520 small calculi coexisted with a large one weighing 51 ounces.[174] There is an old record of 32 stones having been removed from a man of eighty-one, a native of Dantzic, 16 of which were as large as a pigeon's egg. Kelly [f] speaks of 228 calculi in the bladder of a man of seventy-three, 12 being removed before death. The largest weighed 111 grains. Goodrich [g] took 96 small stones from the bladder of a lad. Among the older records of numerous calculi Burnett mentions 70; Desault, over 200; the Ephemerides, 120; Weickman, over 100; Fabricius Hildanus, 2000 in two years; and there is a remarkable case of 10,000 in all issuing from a young girl.[h] Greenhow [i] mentions 60 stones removed from the bladder. An older issue of The Lancet contains an account of lithotrity performed on the same patient 48 times.

Occasionally the **calculi** are **discharged spontaneously.** Trioen [784] mentions the issue of a calculus through a perineal aperture, and there are many similar cases on record. There is an old record of a stone weighing five ounces being passed by the penis.[j] Schenck mentions a calculus perforating the bladder and lodging in the groin. Simmons [k] reports a case in which a calculus passed through a fistulous sore in the loins without any concomitant passage of urine through the same passage. Vosberg [l] mentions a calculus in a patent urachus; and calculi have occasionally been known to pass from the umbilicus. Gourges [m] mentions the spontaneous excretion of a five-ounce calculus; and Thompson [n] speaks of the discharge of two calculi of enormous size.

Of the **extravesical calculi** some are true calculi, while others are simply the result of calcareous or osseous degeneration. **Renal and biliary calculi** are too common to need mention here. There are some extraordinary calculi taken from a patient at St. Bartholomew's Hospital and deposited in the museum of that institution. The patient was a man of thirty-eight. In the

[a] 476, 1890, i., 978. [b] 491, 1882, 287. [c] 536, 1889, i., 369.
[d] 491, 1889, 486. [e] 124, 1852, xxiii., 411. [f] 218, 1852. [g] 629, 1700, 149.
[h] Jour. der Pract. Heilkunde, Hufeland, c. 18, Band i., p. 115. [i] 490, 1837, xx., 551–53.
[j] Samml. med. Wahrnehm, Band viii., p. 258. [k] 629, 1774, 108.
[l] 538, 1877, xii., 606. [m] 462, T. viii., 351. [n] 779, 1857–58, 295.

right kidney were found a calculus weighing 36½ ounces, about 1000 small calculi, and a quantity of calcareous dust. In the left kidney there was a calculus weighing 9¾ ounces, besides a quantity of calcareous dust. The calculi in this case consisted chiefly of phosphate of magnesium and ammonium.[a] Cordier of Kansas City, Mo., successfully removed a renal calculus weighing over three ounces from a woman of forty-two. The accompanying illustration (Fig. 270) shows the actual size of the calculus.

Fig. 270.—Renal calculus (full size) (Cordier).

At the University College Hospital, London, there are exhibited 485 gall-stones that were found postmortem in a gall-bladder. Vanzetti reports[b] the removal of a **preputial calculus** weighing 224 grams. Phillipe[c] mentions the removal of a calculus weighing 50 grams from the prepuce of an Arab boy of seven. Croft[d] gives an account of some preputial calculi removed from two natives of the Solomon Islands by an emigrant medical officer in Fiji. In one case 22 small stones were removed, and in the other a single calculus weighing one ounce 110 grains. Congenital phimosis is said to be very common among the natives of Solomon Islands.

In September, 1695, Bernard[e] removed two stones from the meatus urinarius of a man, after a lodgment of twenty years. Block[f] mentions a similar case, in which the lodgment had lasted twenty-eight years. Walton[g] speaks of a **urethral calculus** gradually increasing in size for fifty years. Ashburn[h] shows (Fig. 271) what he considers the largest calculus ever removed from the urethra. It was 2⅛ inches long, and 1¼ inches in diameter; it was white on the outside, very hard, and was shaped and looked much like a potato. Its dry weight was 660 grains. At one end was a polished surface that corresponded with a similar surface on a smaller stone that lay against it; the latter calculus was shaped like a lima bean, and

Fig. 271.—Urethral calculus (full size) (Ashburn).

[a] See 550, vol. lvii., 77. [b] 242, 1844. [c] 662, 1843, 226. [d] 767, xviii., 8.
[e] 629, 1700, 153. [f] 104, 1748, viii., 441. [g] 476, 1862, i., 384. [h] 553, Nov. 23, 1895.

weighed 60 grains. Hunt[a] speaks of eight calculi removed from the urethra of a boy of five. Herman and the Ephemerides mention cases of calculi in the seminal vesicles.

Calcareous degeneration is seen in the ovary, and Peterman[b] speaks of a **stone in the ovary. Uterine calculi** are described by Cuevas[c] and Harlow;[d] the latter mentions that the calculus he saw was egg-shaped. There is an old chronicle of a stone taken from the womb of a woman near Trent, Somersetshire, at Easter, 1666, that weighed four ounces. The Ephemerides speaks of a calculus coming away with the menstrual fluid.

Stones in the heart are mentioned by medical writers, and it is said[e] that two stones as large as almonds were found in the heart of the Earl of Balcarres.

Morand[f] speaks of a calculus ejected from the mouth by a woman.

An old record says[g] that stones in the brain sometimes are the cause of convulsions. D'Héricourt reports the case of a girl who died after six months' suffering, whose pineal gland was found petrified, and the incredible size of a chicken's egg. Blasius, Diemerbroeck, and the Ephemerides, speak of stones in the location of the pineal gland.

Salivary calculi are well known; they may lodge in any of the buccal ducts. There is a record of the case[h] of a man of thirty-seven who suffered great pain and profuse salivation. It was found that he had a stone as large as a pigeon's egg under his tongue.

Umbilical calculi are sometimes seen, and Dean[i] reports such a case. There is a French record[j] of a case of exstrophy of the umbilicus, attended with abnormal concretions.

Aetius, Marcellus Donatus, Scaliger, and Schenck mention calculi of the eyelids.

There are some extraordinary cases of **retention and suppression of urine** on record. Actual retention of urine, that is, urinary secretion passed into the bladder, but retention in the latter viscus by inanition, stricture, or other obstruction, naturally cannot continue any great length of time without mechanically rupturing the vesical walls; but suppression of urine or absolute anuria may last an astonishingly extended period. Of the cases of retention of urine, Féréol[k] mentions that of a man of forty-nine who suffered absolute retention of urine for eight days, caused by the obstruction of a uric acid calculus. Cunyghame[l] reports a case of mechanic obstruction of the flow of urine for eleven days. Trapenard speaks of retention of urine for seven days. Among the older writers Bartholinus[189] mentions ischuria lasting fourteen days; Cornarius, fourteen days; Rhodius, fifteen days; the Ephemerides, ten, eleven, and twelve days. Croom[m] notes a case of retention of

[a] 130, 1861, ii., 129. [b] Obs. Med. dec., ii. [c] 323, 1875, ii., 35. [d] 218, 1870, 70.
[e] 629, 1700, 158. [f] Paris, 1754. [g] 462, iv. [h] 462, vol. v. [i] 176, 1859.
[j] 363, 443. [k] 653, 1890, 152. [l] 318, 1874–75, xx., 317. [m] 318, 1885, xxxi., 734.

urine from laceration of the vagina during first coitus. Foucard[a] reports a case of retention of urine in a young girl of nineteen, due to accumulation of the menstrual fluid behind an imperforate hymen.

The accumulation of urine in cases of ischuria is sometimes quite excessive. De Vilde[b] speaks of 16 pints being drawn off. Mazoni cites a case in which 15 pounds of urine were retained; and Wilson[c] mentions 16 pounds of urine being drawn off. Frank[d] reports instances in which both 12 and 30 pounds of urine were evacuated. There is a record at the beginning of this century[e] in which it is stated that 31 pounds of urine were evacuated in a case of ischuria.

Following some toxic or thermic disturbance, or in diseased kidneys, suppression of urine is quite frequently noticed. The older writers report some remarkable instances: Haller[397] mentions a case lasting twenty-two weeks; Domonceau,[f] six months; and Marcellus Donatus,[306] six months.

Whitelaw[g] describes a boy of eight who, after an attack of scarlet fever, did not pass a single drop of urine from December 7th to December 20th, when two ounces issued, after vesication over the kidneys. On January 2d two ounces more were evacuated, and no more was passed until the bowel acted regularly. On January 5th a whole pint of urine passed; after that the kidneys acted normally and the boy recovered. It would be no exaggeration to state that this case lasted from December 5th to January 5th, for the evacuations during this period were so slight as to be hardly worthy of mention.

Lemery[h] reports observation of a monk who during eight years vomited periodically instead of urinating in a natural way. Five hours before vomiting he experienced a strong pain in the kidneys. The vomitus was of dark-red color, and had the odor of urine. He ate little, but drank wine copiously, and stated that the vomiting was salutary to him, as he suffered more when he missed it.

Bryce[i] records a case of anuria of seventeen days' standing. Butler[j] speaks of an individual with a single kidney who suffered suppression of urine for thirteen days, caused by occlusion of the ureter by an inspissated thrombus. Dubuc[k] observed a case of anuria which continued for seventeen days before the fatal issue. Fontaine[l] reports a case of suppression of urine for twenty-five days. Nunneley[m] showed the kidneys of a woman who did not secrete any urine for a period of twelve days, and during this time she had not exhibited any of the usual symptoms of uremia. Peebles[n] mentions a case of suspension of the functions of the kidneys more than once for five weeks, the patient exhibiting neither coma, stupor, nor vomiting. Oke[o]

[a] 100, xxx., 103. [b] 462, T. xlvii., 134. [c] 524, ii. [d] 351, L. vi., 282.
[e] 565, 1810. [f] 462, T. xi., 117. [g] 476, 1877, ii., 460. [h] 302, iv., 225.
[i] South. Clinic, Richmond, 1881, iv., 545. [j] 476, 1890, i., 79. [k] 789, 1879, 715.
[l] 809, 1874, i., 407. [m] 779, xi., 145. [n] 318, 1836, xlvi., 158. [o] 656, 1849, x., 259.

speaks of total suppression of urine during seven days, with complete recovery; and Paxon mentions a case in a child that recovered after five days' suppression. Russell[a] reports a case of complete obstructive suppression for twenty days followed by complete recovery. Scott and Shroff mention recovery after nine days' suppression.

The most **persistent constipation** may exist for weeks, or even months, with fair health. The fact seemed to be a subject of much interest to the older writers. De Cabalis[b] mentions constipation lasting thirty-seven days; Caldani, sixty-five days; Lecheverel,[c] thirty-four days; and Pomma[d] eight months; Sylvaticus, thirty months; Baillie,[e] fifteen weeks; Blanchard,[213] six weeks; Smetius,[730] five months; Trioen,[784] three months; Devilliers,[f] two years; and Gignony,[g] seven years. Riverius[687] mentions death following constipation of one month, and says that the intestines were completely filled. Moosman[h] mentions death from the same cause in sixty days. Frank speaks of constipation from intestinal obstructions lasting for three weeks, and Manget mentions a similar case lasting three months.

Early in the century Révolat reported in Marseilles an observation of an eminently nervous subject addicted to frequent abuse as regards diet, who had not had the slightest evacuation from the bowel for six months. A cure was effected in this case by tonics, temperance, regulation of the diet, etc. In Tome xv. of the Commentaries of Leipzig there is an account of a man who always had his stercoral evacuations on Wednesdays, and who suffered no evil consequences from this abnormality. This state of affairs had existed from childhood, and, as the evacuations were abundant and connected, no morbific change or malformation seemed present. The other excretions were slightly in excess of the ordinary amount. There are many cases of constipation on record lasting longer than this, but none with the same periodicity and without change in the excrement. Tommassini[i] records the history of a man of thirty, living an ordinary life, who became each year more constipated. Between the ages of twenty and twenty-four the evacuations were gradually reduced to one in eight or ten days, and at the age of twenty-six, to one every twenty-two days. His leanness increased in proportion to his constipation, and at thirty his appetite was so good that he ate as much as two men. His thirst was intense, but he secreted urine natural in quantity and quality. Nothing seemed to benefit him, and purgatives only augmented his trouble. His feces came in small, hard balls. His tongue was always in good condition, the abdomen not enlarged, the pulse and temperature normal.

Emily Plumley was born on June 11, 1850, with an imperforate anus, and lived one hundred and two days without an evacuation. During the whole

[a] 548, 1879, i., 474. [b] Phenom. Medica. [c] 463, July, 1810, p. 74. [d] Ibid.
[e] Trans. Soc. for Improvement of Surg. and Med. Knowl., ii., No. 14. [f] 462, T. iv., 256.
[g] 462, T. x., 410. [h] 524, 1797. [i] Journal de Méd. de Parme., 1808.

period there was little nausea and occasional regurgitation of the mother's milk, due to over-feeding.[a] Cripps[b] mentions a man of forty-two with stricture of the rectum, who suffered complete intestinal obstruction for two months, during which time he vomited only once or twice. His appetite was good, but he avoided solid food. He recovered after the performance of proctotomy.

Fleck[c] reports the case of a Dutchman who, during the last two years, by some peculiar innervation of the intestine, had only five or six bowel movements a year. In the intervals the patient passed small quantities of hard feces once in eight or ten days, but the amount was so small that they constituted no more than the feces of one meal. Two or three days before the principal evacuation began the patient became ill and felt uncomfortable in the back; after sharp attacks of colic he would pass hard and large quantities of offensive feces. He would then feel better for two or three hours, when there would be a repetition of the symptoms, and so on until he had four or five motions that day. The following day he would have a slight diarrhea and then the bowels would return to the former condition. The principal fecal accumulations were in the ascending and transverse colon and not only could be felt but seen through the abdominal wall. The patient was well nourished and had tried every remedy without success. Finally he went to Marienbad where he drank freely of the waters and took the baths until the bowel movements occurred once in two or three days.

There is a record[d] of a man who stated that for two years he had not passed his stool by the anus, but that at six o'clock each evening he voided feces by the mouth. His statement was corroborated by observation. At times the evacuation took place without effort, but was occasionally attended with slight pain in the esophagus and slight convulsions. Several hours before the evacuation the abdomen was hard and distended, which appearance vanished in the evening. In this case there was a history of an injury in the upper iliac region.

The first accurate ideas in reference to **elephantiasis arabum** are given by Rhazes, Haly-Abas, and Avicenna, and it is possibly on this account that the disease received the name elephantiasis arabum. The disease was afterward noticed by Forestus, Mercurialis, Kaempfer, Ludoff, and others. In 1719 Prosper Alpinus wrote of it in Egypt, and the medical officers of the French army that invaded Egypt became familiar with it; since then the disease has been well known.

Alard relates as a case of elephantiasis that of a lady of Berlin, mentioned in the Ephemerides of 1694, who had an abdominal tumor the lower part of which reached to the knees. In this case the tumor was situated in the skin and no vestige of disease was found in the abdominal cavity and no sensible alteration had taken place in the veins. Delpech quotes a similar case of ele-

[a] 656, 1851, 123. [b] 476, 1886, ii., 444. [c] 821, quoted 224, 1879, i., 594. [d] 822, 1891.

phantiasis in the walls of the abdomen in a young woman of twenty-four, born at Toulouse.

Lymphedema, or elephantiasis arabum, is a condition in which, in the substance of a limb or a part, there is diffused dilatation of the lymphatics, with lymphostasis. Such a condition results when there is obstruction of so large a number of the ducts converging to the root of the extremity or part that but little relief through collateral trunks is possible. The affected part becomes swollen and hardened, and sometimes attains an enormous size. It is neither reducible by position nor pressure. There is a corresponding dilatation and multiplication of the blood-vessels with the connective-tissue hypertrophy. The muscles waste, the skin becomes coarse and hypertrophied. The swollen

Fig. 272.—Lymphedema of the left leg five years after its onset (Keen and White).

Fig. 273.—Lymphedema in its later stage (Keen and White).

limb presents immense lobulated masses, heaped up at different parts, separated from one another by deep sulci, which are especially marked at the flexures of the joints. Although elephantiasis is met with in all climates, it is more common in the tropics, and its occurrence has been repeatedly demonstrated in these localities to be dependent on the presence in the lymphatics of the filaria sanguinis hominis. The accompanying illustration (Fig. 272)[845] shows the condition of the limb of a girl of twenty-one, the subject of lymphedema, five years after the inception of the disease. The changes in the limb were as yet

moderate. The photograph from which the cut was made was taken in 1875. At the present time (seventeen years later) the case presents the typical condition of the worst form of elephantiasis. Repeated attacks of lymphangitis have occurred during this period, each producing an aggravation of the previous condition. The leg below the knee has become enormously deformed by the production of the elephantoid masses; the outer side of the thigh remains healthy, but the skin of the inner side has developed so as to form a very large and pendant lobulated mass. A similar condition has begun to develop in the other leg, which is now about in the condition of the first, as shown in the figure. Figure 273 represents this disease in its most aggravated form, a condition rarely observed in this country. As an example of the change in the weight of a person after the inception of this disease, we cite a case reported by Griffiths.[a] The patient was a woman of fifty-two who, five years previous, weighed 148 pounds. The elephantoid change was below the waist, yet at the time of report the woman weighed 387 pounds. There was little thickening of the skin. The circumference of the calf was 28 inches; of the thigh, 38 inches; and of the abdomen, 80 inches; while that of the arm was only 15 inches.

Fig. 274.—Elephantiasis of enormous development ("Barbadoes leg") (after Smith).

Fig. 275.—Elephantoid change of both feet.

The condition commonly known as "Barbadoes leg" (Fig. 274) is a form of elephantiasis deriving its name from its relative frequency in Barbadoes.

[a] Kansas City Med. Index, Dec., 1894.

Figure 275 represents a well-known exhibitionist who, from all appearances, is suffering from an elephantoid hypertrophy of the lower extremities, due to a lymphedema. Quite a number of similar exhibitionists have been shown in recent years, the most celebrated of whom was Fanny Mills, one of whose feet alone was extensively involved, and was perhaps the largest foot ever seen.

Elephantiasis seldom attacks the **upper extremities.** Of the older cases Rayer reports four collected by Alard. In one case the hard and permanent swelling of the arm occurred after the application of a blister; in another the arm increased so that it weighed more than 200 Genoese pounds, 40 of which consisted of serum. The swellings of the arm and forearm resembled a distended bladder. The arteries, veins, and nerves had not undergone any alteration, but the lymphatics were very much dilated and loaded with lymph. The third case was from Fabricius Hildanus, and the fourth from Hendy. Figure 276 represents a remarkable elephantoid change in the hand of an elderly German woman. Unfortunately there is no medical description of the case on record, but the photograph is deemed worthy of reproduction.

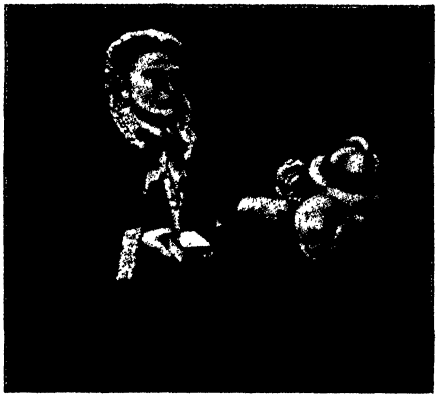


Fig. 276.—Elephantoid change of the hand.

Terry [a] describes a French mulatto girl of eleven whose left hand was enormously increased in weight and consistency, the chief enlargement being in the middle finger, which was 6½ inches long, and 5½ inches about the nail, and 8½ around the base of the finger. The index finger was two inches thick and four inches long, twisted and drawn, while the other fingers were dwarfed. The elephantiasis in this case slowly and gradually increased in size until the hand weighed 3½ pounds. The skin of the affected finger, contrary to the general appearance of a part affected with elephantiasis, was of normal color, smooth, shiny, showed no sensibility, and the muscles had undergone fatty degeneration. It was successfully amputated in August, 1894. The accompanying illustration (Fig. 277) shows a dorsal view of the affected hand.

Magalhaes of Rio Janeiro [b] reports a very interesting case of **elephantiasis of the scalp,** representing dermatolysis, in which the fold of hypertrophied skin fell over the face like the hide of an elephant (Fig. 278), somewhat similar in appearance to the "elephant-man." Figure 279 represents a some-

[a] 593, July, 1895. [b] 124, 1893.

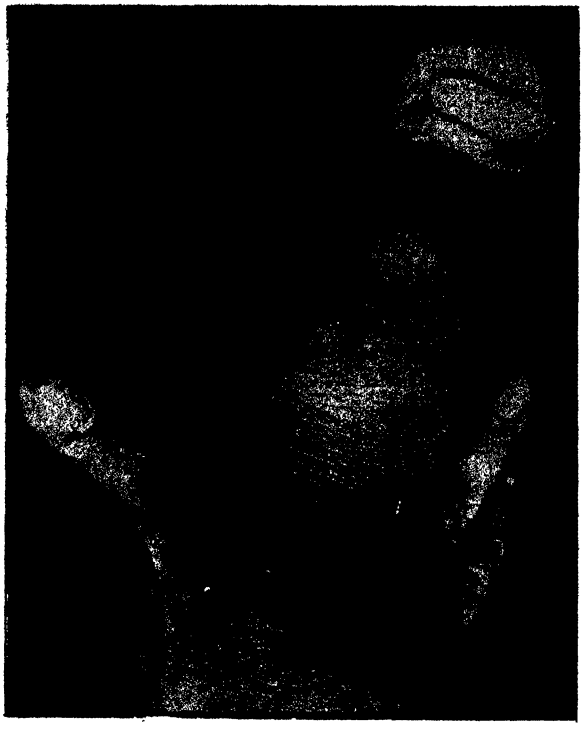


Fig. 277.—Elephantiasis of the middle finger (Terry).

Fig. 278.—Elephantiasis of the scalp (Magalhaes).

what similar hypertrophic condition of the scalp and face reported in the Photographic Review of Medicine and Surgery, 1870.

Fig. 279.—Hypertrophic tumor of the scalp and face.

Elephantiasis of the face sometimes only attacks it on one side. Such a case was reported by Alard, in which the elephantiasis seems to have been complicated with eczema of the ear. Willier, also quoted by Alard, describes a remarkable case of elephantiasis of the face. After a debauch this patient experienced violent pain in the left cheek below the zygomatic arch; this soon extended under the chin, and the submaxillary glands enlarged and became painful; the face swelled and became erythematous, and the patient experienced nausea and slight chills. At the end of six months there was another attack, after which the patient perceived that the face continued puffed. This attack was followed by several others, the face growing larger and larger. In similar cases tumefaction assumes enormous proportions, and Schenck [a] speaks of a man whose head exceeded that of an ox in size, the lower part of the face being entirely covered with the nose, which had to be raised to enable its unhappy owner to breathe.

Rayer cites two instances in which **elephantiasis of the breast** enlarged these organs to such a degree that they hung to the knees. Salmuth [b] speaks of a woman whose breasts increased to such a size that they hung down to her knees. At the same time she had in both axillæ glandular tumors as large as the head of a fetus. Borellus [841] also quotes the case of a woman whose breasts became so large that it was necessary to support them by straps, which passed over the shoulders and neck.

Fig. 280.—Elephantiasis of the labia

Elephantiasis is occasionally seen in the genital regions of the female (Fig. 280), but more often in the **scrotum** of the male, in which location it produces enormous tumors, which sometimes reach to the ground and become so heavy as to prevent locomotion. This condition is curious in the fact that

[a] 718, L. i., 12.

[b] 706, cent. ii., obs. ix.

these immense tumors have been successfully removed, the testicles and penis, which had long since ceased to be distinguished, saved, and their function restored. Alibert mentions a patient who was operated upon by Clot-Bey, whose scrotum when removed weighed 110 pounds; the man had two children after the disease had continued for thirteen years, but before it had obtained its monstrous development—a proof that the functions of the testicles had not been affected by the disease.

There are several old accounts of scrotal tumors which have evidently been elephantoid in conformation. In the Ephemerides in 1692 there was mentioned a tumor of the scrotum weighing 200 pounds. In the West Indies it was reported that rats have been known to feed on these enormous tumors, while the deserted subjects lay in a most helpless condition. Larrey mentioned a case of elephantiasis of the scrotum in which the tumor weighed over 200 pounds. Sir Astley Cooper removed a tumor of 56 pounds weight from a Chinese laborer. It extended from beneath the umbilicus to the anterior border of the anus; it had begun in the prepuce ten years previously.[a] Clot-Bey[b] removed an elephantoid tumor of the scrotum weighing 80 pounds, performing castration at the same time. Alleyne[c] reports a case of elephantiasis, in which he successfully removed a tumor of the integuments of the scrotum and penis weighing 134 pounds.

Bicet[d] mentions a curious instance of elephantiasis of the penis and scrotum which had existed for five years. The subject was in great mental misery and alarm at his unsightly condition. The parts of generation were completely buried in the huge mass. An operation was performed in which all of the diseased structures that had totally unmanned him were removed, the true organs of generation escaping inviolate. Thebaud[e] mentions a tumor of the scrotum, the result of elephantiasis, which weighed 63½ pounds. The weight was ascertained by placing the tumor on the scales, and directing the patient to squat over them without resting any weight of the body on the scales. This man could readily feel his penis, although his surgeons could not do so. The bladder was under perfect control, the urine flowing over a channel on the exterior of the scrotum, extending 18 inches from the meatus. Despite his infirmity this patient had perfect sexual desire, and occasional erections and emissions. A very interesting operation was performed with a good recovery.

Partridge[f] reports an enormous scrotal tumor which was removed from a Hindoo of fifty-five, with subsequent recovery of the subject. The tumor weighed 111½ pounds. The ingenious technic of this operation is well worth perusal by those interested. Goodman[g] successfully removed an elephantiasis of the scrotum from a native Fiji of forty-five. The tumor weighed 42 pounds, without taking into consideration the weight of the fluid

[a] 476, 1831, ii., 86. [b] 363, 1834. [c] 523, 1852. [d] 434, 1837, ii., 251.
[e] 597, May, 1867. [f] 548, 1880, i., 660. [g] 476, 1876, ii., 889.

which escaped in abundance during the operation and also after the operation, but before it was weighed. Van Buren and Keyes mention a tumor of the scrotum of this nature weighing 165 pounds. Quoted by Russell, Hendy describes the case of a negro who had successive attacks of glandular swelling of the scrotum, until finally the scrotum was two feet long and six feet in circumference. It is mentioned that mortification of the part caused this patient's ultimate death.

Figure 281 is taken from a photograph loaned to the authors by Dr. James Thorington. The patient was a native of Fiji, and was successfully operated on, with preservation of the testes. The tumor, on removal, weighed 120 pounds.

W. R. Browne, Surgeon-General, reports from the Madras General Hospital an operation on a patient of thirty-five with elephantoid scrotum of six years' duration. The proportions of the scrotum were as follows: Horizontally the circumference was six feet 6½ inches, and vertically the circumference was six feet ten inches, The penis was wholly hidden, and the urine passed from an opening two feet 5½ inches from the pubis. The man had complete control of his bladder, but was unable to walk. The operation for removal occupied one hour and twenty minutes, and the tumor removed weighed 124¾ pounds. Little blood was lost on account of an elastic cord tied about the neck of the tumor, and secured by straps to a leather waist-belt. Recovery was prompt. Cody [a] speaks of the successful removal of a scrotal tumor weighing 56 pounds.

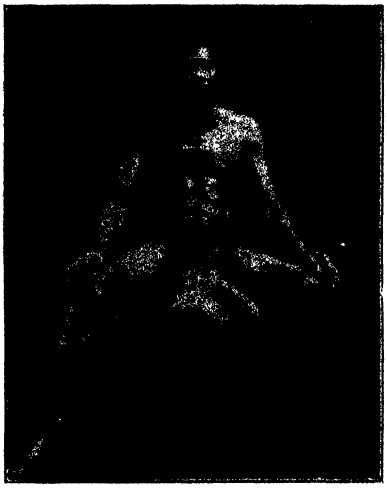


Fig. 281.—Elephantiasis of the scrotum in a native of Fiji.

Fenger [b] describes a case of the foregoing nature in a German of twenty-three, a resident of Chicago. The growth had commenced eight years previously, and had progressively increased. There was no pain or active inflammation, and although the patient had to have especially constructed trousers he never ceased his occupation as a driver. The scrotum was represented by a hairless tumor weighing 22 pounds, and hanging one inch below the knees. No testicles or penis could be made out. Fenger removed the tumor, and the man was greatly improved in health. There was still swelling of the inguinal glands on both sides, but otherwise the operation

[a] 476, 1882 [b] 124, Oct., 1891.

was very successful. The man's mental condition also greatly improved. Fenger also calls especial attention to the importance of preserving the penis and testes in the operation, as although these parts may apparently be obliterated their functions are undisturbed.

The statistics of this major operation show a surprisingly small mortality. Fayrer operated on 28 patients with 22 recoveries and six deaths, one from shock and five from pyemia. The same surgeon collected 193 cases, and found the general mortality to be 18 per cent. According to Ashhurst, Turner, who practised as a medical missionary in the Samoan Islands, claims to have operated 136 times with only two deaths. McLeod, Fayrer's successor in India, reported 129 cases with 23 deaths.

Early in this century Rayer described a case of elephantiasis in a boy of seventeen who, after several attacks of erysipelas, showed marked diminution of the elephantoid change; the fact shows the antagonism of the streptococcus erysipelatis to hypertrophic and malignant processes.

Acromegaly is a term introduced by Marie, and signifies large extremities. It is characterized by an abnormally large development of the extremities and of the features of the face,—the bony as well as the soft parts. In a well-marked case the hands and feet are greatly enlarged, but not otherwise deformed, and the normal functions are not disturbed. The hypertrophy involves all the tissues, giving a curious spade-like appearance to the hands. The feet are similarly enlarged, although the big toe may be relatively much larger. The nails also become broad and large. The face increases in volume and becomes elongated, in consequence of the hypertrophy of the superior and inferior maxillary bones. The latter often projects beyond the upper teeth. The teeth become separated, and the soft parts increase in size. The nose is large and broad, and the skin of the eyelids and ears is enormously hypertrophied. The tongue is greatly hypertrophied. The disease is of long duration, and late in the history the bones of the spine and thorax may acquire great deformity. As we know little of the influences and sources governing nutrition, the pathology and etiology of acromegaly are obscure. Marie regards the disease as a systemic dystrophy analogous to myxedema, due to a morbid condition of the pituitary body, just as myxedema is due to disease of the thyroid. In several of the cases reported the squint and optic atrophy and the amblyopia have pointed to the pituitary body as the seat of a new growth of hypertrophy. Pershing[a] shows a case of this nature (Fig. 282). The enlargement of the face and extremities was characteristic, and the cerebral and ocular symptoms pointed to the pituitary body as the seat of the lesion. Unverricht, Thomas, and Ransom[843] report cases in which the ocular lesions, indicative of pituitary trouble, were quite prominent. Of 22 cases collected by Tamburini[b] 19 showed some change in the pituitary body, and in the remaining three cases either the diagnosis was uncertain or the disease was

[a] Inter. Med. Mag., June, 1894. [b] Centralbl. f. Nerv. u. Psych., Dec., 1894.

of very short duration. Linsmayer [a] reported a case in which there was a softened adenoma in the pituitary body, and the thymus was absent.

Hersman [b] reports an interesting case of progressive enlargement of the

Fig. 282.

Mrs. A. B., aged twenty years, showing normal appearance of the patient.

Same patient, aged forty-two years, affected with acromegaly.

(Pershing.)

hands in a clergyman of fifty. Since youth he had suffered with pains in the joints. About three years before the time of report he noticed enlargement

Fig. 283.—Progressive enlargements of the hands, anterior and posterior views (Hersman).

of the phalangeal joint of the third finger of the right hand. A short time later the whole hand became gradually involved and the skin assumed a darker

[a] 838, 1894, No. 14

[b] Inter. Med. Mag., Oct.. 1894.

hue. Sensation and temperature remained normal in both hands; acromegaly was excluded on account of the absence of similar changes elsewhere. Hersman remarks that the change was probably due to increase in growth of the fibrous elements of the subcutaneous lesions about the tendons, caused by rheumatic poison. Figure 283 shows the palmar and dorsal surfaces of both hands.

Chiromegaly is a term that has been applied by Charcot and Brissaud to the pseudoacromegaly that sometimes occurs in syringomyelia. Most of the cases that have been reported as a combination of these two diseases are now thought to be only a syringomyelia. A recent case is reported by Marie.[789] In this connection it is interesting to notice a case of what might be called acute symptomatic transitory pseudoacromegaly, reported by Potovski:[a] In an insane woman, and without ascertainable cause, there appeared an enlargement of the ankles, wrists, and shoulders, and later of the muscles, with superficial trophic disturbances that gradually disappeared. The author excludes syphilis, tuberculosis, rheumatism, gout, hemophilia, etc., and considers it to have been a trophic affection of cerebral origin. Cases of pneumonic osteoarthropathy simulating acromegaly have been reported by Korn[b] and Murray.[c]

Megalocephaly, or as it was called by Virchow, **leontiasis ossea**, is due to a hypertrophic process in the bones of the cranium. The cases studied by Virchow were diffuse hyperostoses of the cranium. Starr[d] describes what he supposes to be a case of this disease, and proposes the title megalocephaly as preferable to Virchow's term, because the soft parts are also included in the hypertrophic process. A woman of fifty-two, married but having no children, and of negative family history, six years before the time of report showed the first symptoms of the affection, which began with formication in the finger-tips. This gradually extended to the shoulders, and was attended with some uncertainty of tactile sense and clumsiness of movement, but actual anesthesia had never been demonstrated. This numbness had not invaded the trunk or lower extremities, although there was slight uncertainty in the gait. There had been a slowly progressing enlargement of the head, face, and neck, affecting the bone, skin, and subcutaneous tissues, the first to the greatest degree. The circumference of the neck was 16 inches; the horizontal circumference of the head was 24 inches; from ear to ear, over the vertex, 15 inches; and from the root of the nose to the occipital protuberance, 16 inches. The cervical vertebræ were involved, and the woman had lost five inches in height. It may be mentioned here that Brissaud and Meige noticed the same loss in height, only more pronounced, in a case of gigantism, the loss being more than 15 inches. In Starr's case the tongue was normal and there was no swelling of the thyroid.

Cretinism is an endemic disease among mountainous people who drink largely of lime water, and is characterized by a condition of physical, physiologic, and mental degeneracy and nondevelopment, and possibly goiter. The

[a] Quoted 843, 613. [b] 224, Dec. 2, 1893. [c] 224, Feb. 9, 1895. [d] 124, Dec., 1894.

subjects of this disease seldom reach five feet in height, and usually not more than four. The word cretin is derived from the Latin *creatura*. They are found all over the world. In Switzerland it is estimated that in some cantons there is one cretin to every 25 inhabitants. In Styria, the Tyrol, and along the Rhine cretins are quite common, and not long since cases existed in Derbyshire. These creatures have been allowed to marry and generate, and thus extend their species. In "Le Médicin de Campagne," Balzac has given a vivid picture of the awe and respect in which they were held and the way in which they were allowed to propagate. Speaking of the endemic cretins, Beaupré says: "I see a head of unusual form and size, a squat and bloated figure, a stupid look, bleared, hollow, and heavy eyes, thick, projecting eyelids, and a flat nose. His face is of a leaden hue, his skin dirty, flabby, covered with tetters, and his thick tongue hangs down over his moist, livid lips; his mouth, always open and full of saliva, shows teeth going to decay. His chest is narrow, his back curved, his breath asthmatic, his limbs short, misshapen, without power. The knees are thick and inclined inward, the feet flat. The large head droops listlessly on the breast; the abdomen is like a bag." The cretin is generally deaf and dumb, or only able to give a hoarse cry. He is indifferent to heat and cold, and even to the most revolting odors. The general opinion has always been that the sexual desire and genital organs are fully developed.

A quotation under our observation credits Colonel Sykes with the following statistics of cretinism, which show how in some locations it may be a decided factor of population. In December, 1845, in a population of 2,558,349 souls (the locality not mentioned), there were 18,462 people with simple goiter. Of the cretins without goiter there were 2089. Of cretins with goiter there were 3909; and cretins in which goiter was not stated 962, making a total of 6960. Of these 2185 had mere animal instincts; 3531 possessed very small intellectual faculties; 196 were almost without any; 1048 not classified. Of this number 2483 were born of healthy and sane fathers; 2285 from healthy mothers; 961 from goitrous fathers; 1267 from goitrous mothers; 49 from cretin fathers; 41 from cretin mothers; 106 from cretin fathers with goiter; 66 from cretin mothers with goiter; 438 fathers and 405 mothers were not specified.

Sporadic cretinism, or congenital myxedema, is characterized by a congenital absence of the thyroid, diminutiveness of size, thickness of neck, shortness of arms and legs, prominence of the abdomen, large size of the face, thickness of the lips, large and protruding tongue, and imbecility or idiocy (Fig. 284). It is popularly believed that coitus during intoxication is the cause of this condition. Osler[a] was able to collect 11 or 12 cases in this country. The diagnosis is all-important, as the treatment by the thyroid extract produces the most noteworthy results. There are several remarkable

[a] 124, Nov., 1893.

recoveries on record, but possibly the most wonderful is the case of J. P. West of Bellaire, Ohio,[a] the portraits of which are reproduced in Plate 11. At seventeen months the child presented the typical appearance of a sporadic cretin. The astonishing results of six months' treatment with thyroid extract are shown in the second figure. After a year's treatment the child presents the appearance of a healthy and well-nourished little girl.

Myxedema proper is a constitutional condition due to the loss of the function of the thyroid gland. The disease was first described by Sir William Gull as a cretinoid change, and later by William Ord of London, who suggested the name. It is characterized clinically by a mxyedematous condition of the subcutaneous tissues and mental failure, and anatomically by atrophy of the thyroid gland. The symptoms of myxedema, as given by Ord, are marked increase in the general bulk of the body, a firm, inelastic swelling of the skin, which does not pit on pressure; dryness and roughness which tend, with swelling, to obliterate the lines of expression in the face; imperfect nutrition of the hair; local tumefaction of the skin and subcutaneous tissues, particularly in the supraclavicular region. The physiognomy is remarkably altered; the features are coarse and broad, the lips thick, the nostrils broad and thick, and the mouth enlarged. There is a striking slowness of thought and of movement; the memory fails, and conditions leading to incipient dementia intervene. The functions of the thoracic and abdominal organs seem to be normal, and death is generally due to some intercurrent disease, possibly tuberculosis.

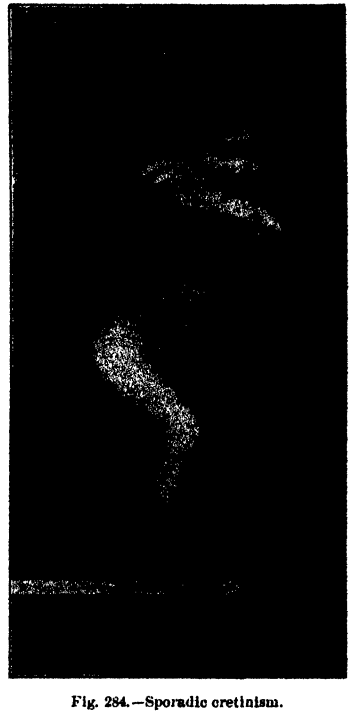


Fig. 284.—Sporadic cretinism.

A condition akin to myxedema occurs after operative removal of the thyroid gland.

In a most interesting lecture Brissaud[b] shows the intimate relation between myxedema, endemic cretinism, sporadic cretinism, or myxedematous idiocy, and infantilism. He considers that they are all dependent upon an inherited or acquired deficiency or disease of the thyroid gland, and he presents cases illustrating each affection. Figure 285 shows a case of myxedema, one of myxedema in a case of arrested development—a transition case between myx-

[a] 165, May, 1894. [b] Leçons sur les Mal. Nerv., Paris, 1895, 606.

edema of the adult and sporadic cretinism—and a typical case of sporadic cretinism.

Cagots are an outcast race or clan of dwarfs in the region of the Pyrenees, and formerly in Brittany, whose existence has been a scientific problem since the sixteenth century, at which period they were known as Cagots, Gahets, Gafets, Agotacs, in France; Agotes or Gafos, in Spain; and Cacous, in Lower Brittany. Cagot meant the dog of a Goth; they were of supposed Gothic origin by some, and of Tartar origin by others. These people were formerly supposed to have been the descendants of lepers, or to have been the victims of leprosy themselves. From the descriptions there is a decided

Fig. 285.—Cases of myxedema and sporadic cretinism (Brissaud).

difference between the Cagots and the cretins. In a recent issue of Cosmos a writer describes Cagots as follows:—

"They inhabit the valley of the Ribas in the northwestern part of the Spanish province now called Gerona. They never exceed 51½ inches in height, and have short, ill-formed legs, great bellies, small eyes, flat noses, and pale, unwholesome complexions. They are usually stupid, often to the verge of idiocy, and much subject to goiter and scrofulous affections. The chief town of the Ribas Valley is Ribas, a place of 1500 inhabitants. about 800 feet above sea-level. The mountains rise about the town to a height of from 6000 to 8000 feet, and command an amazingly beautiful panorama of mountain, plain, and river, with Spanish cities visible upon the one side and French upon the other. The region is rich, both agri-

PLATE II.

culturally and minerally, and is famous for its medicinal springs. In this paradise dwell the dwarfs, perhaps as degraded a race of men and women as may be found in any civilized community. They are almost without education, and inhabit wretched huts when they have any shelter. The most intelligent are employed as shepherds, and in summer they live for months at an elevation of more than 6000 feet without shelter. Here they see no human creature save some of their own kind, often idiots, who are sent up every fifteen or twenty days with a supply of food.

"It is said that formal marriage is almost unknown among them. The women in some instances are employed in the village of Ribas as nurses for children, and as such are found tender and faithful. Before communication throughout the region was as easy as it is now, it was thought lucky to have one of these dwarfs in a family, and the dwarfs were hired out and even sold to be used in beggary in neighboring cities. There are somewhat similar dwarfs in other valleys of the Pyrenees, but the number is decreasing, and those of the Ribas Valley are reduced to a few individuals."

Hiccough is a symptom due to intermittent, sudden contraction of the diaphragm. Obstinate cases are most peculiar, and sometimes exhaust the physician's skill. Symes divides these cases into four groups:—

(1) Inflammatory, seen particularly in inflammatory diseases of the viscera or abdominal membranes, and in severe cases of typhoid fever.

(2) Irritative, as in direct stimulus of the diaphragm in swallowing some very hot substance; local disease of the esophagus near the diaphragm, and in many conditions of gastric and intestinal disorder, more particularly those associated with flatus.

(3) Specific or idiopathic, in which there are no evident causes present; it is sometimes seen in cases of nephritis and diabetes.

(4) Neurotic, in which the primary cause is in the nervous system,—hysteria, epilepsy, shock, or cerebral tumors.

The obstinacy of continued hiccough has long been discussed. Osler calls to mind that in Plato's "Symposium" the physician, Eryximachus, recommended to Aristophanes, who had hiccough from eating too much, either to hold his breath or to gargle with a little water; but if it still continued, "tickle your nose with something and sneeze, and if you sneeze once or twice even the most violent hiccough is sure to go." The attack must have been a severe one, as it is stated subsequently that the hiccough did not disappear until Aristophanes had excited the sneezing.

Among the older medical writers Weber speaks of singultus lasting for five days; Tulpius,[842] for twelve days; Eller and Schenck,[a] for three months; Taranget,[b] for eight months; and Bartholinus,[190] for four years.

At the present day it is not uncommon to read in the newspapers accounts of prolonged hiccoughing. These cases are not mythical, and are paral-

[a] 718, L. iii., obs. 49. [b] 462, lxxxvi., 363.

leled by a number of instances in reliable medical literature. The cause is not always discernible, and cases sometimes resist all treatment.

Holston[a] reports a case of chronic singultus of seven years' standing. It had followed an attack of whooping-cough, and was finally cured apparently by the administration of strychnin. Cowan[b] speaks of a shoemaker of twenty-two who experienced an attack of constant singultus for a week, and then intermittent attacks for six years. Cowan also mentions instances of prolonged hiccough related by Heberden, Good, Hoffman, and Wartmouth. Barrett[c] is accredited with reporting a case of persistent hiccough in a man of thirty-five. Rowland[d] speaks of a man of thirty-five who hiccoughed for twelve years. The paroxysms were almost constant, and occurred once or twice a minute during the hours when the man was not sleeping. There was no noise with the cough. There is another case related in the same journal of a man who died on the fourth day of an attack of singultus, probably due to abscess of the diaphragm, which no remedy would relieve. Moore[e] records a case of a child, injured when young, who hiccoughed until about twenty years of age (the age at the time of report). Foot[f] mentions a lad of fifteen who, except when asleep, hiccoughed incessantly for twenty-two weeks, and who suffered two similar, but less severe, attacks in the summer of 1879, and again in 1880. The disease was supposed to be due to the habit of pressing the chest against the desk when at school. Dexter[g] reports a case of long-continued singultus in an Irish girl of eighteen, ascribed to habitual masturbation. There was no intermission in the paroxysm, which increased in force until general convulsions ensued. The patient said that the paroxysm could be stopped by firm pressure on the upper part of the external genital organs. Dexter applied firm pressure on her clitoris, and the convulsions subsided, and the patient fell asleep. They could be excited by firm pressure on the lower vertebræ. Corson[h] speaks of a man of fifty-seven who, after exposure to cold, suffered exhausting hiccough for nine days; and also records the case of an Irish servant who suffered hiccough for four months; the cause was ascribed to fright. Stevenson[i] cites a fatal instance of hiccough in a stone-mason of forty-four who suffered continuously from May 14th to May 28th. The only remedy that seemed to have any effect in this case was castor-oil in strong purgative doses.

Willard[j] speaks of a man of thirty-four who began to hiccough after an attack of pneumonia, and continued for eighty-six hours. The treatment consisted of the application of belladonna and cantharides plasters, bismuth, and lime-water, camphor, and salts of white hellebore inhaled through the nose in finest powder. Two other cases are mentioned by the same author. Gapper[k] describes the case of a young man who was seized with loud and dis-

[a] West. Lancet, Cincin., 1849. [b] 476, 1841–42, ii., 398. [c] 703, xlvii., 377.
[d] Ibid. [e] Ibid. [f] 310, 1881. [g] 218, xxxii., 195. [h] 594, 1857, ii., 264.
[i] 476, 1883, i., 1043. [j] 616, 1871–72, v., 507. [k] 535, 1801, vi., 17.

tressing hiccough that never ceased for a minute during eighty hours. Two ounces of laudanum were administered in the three days without any decided effect, producing only slight languor.

Ranney [a] reports the case of an unmarried woman of forty-four who suffered from paroxysms of hiccough that persisted for four years. A peculiarity of this attack was that it invariably followed movements of the upper extremities. Tenderness and hyperesthesia over the spinous processes of the 4th, 5th, and 6th cervical vertebræ led to the application of the thermocautery, which, in conjunction with the administration of ergot and bromids, was attended with marked benefit, though not by complete cure. Barlow [b] mentions a man with a rheumatic affection of the shoulder who hiccoughed when he moved his joints. Barlow also recites a case of hiccough which was caused by pressure on the cicatrix of a wound in the left hand.

Beilby [c] reports a peculiar case in a girl of seventeen who suffered an anomalous affection of the respiratory muscle, producing a sound like a cough, but shriller, almost resembling a howl. It was repeated every five or six seconds during the whole of the waking moments, and subsided during sleep. Under rest and free purgation the patient recovered, but the paroxysms continued during prolonged intervals, and in the last six years they only lasted from twenty-four to forty-eight hours.

Parker [d] reports four rebellious cases of singultus successfully treated by dry cups applied to the abdomen. In each case it was necessary to repeat the operation after two hours, but recovery was then rapid. Tatevosoff reports a brilliant cure in a patient with chronic chest trouble, by the use of common snuff, enough being given several times to induce lively sneezing. Griswold [e] records a successful treatment of one case in a man of fifty, occurring after a debauch, by the administration of glonoin, $\frac{1}{100}$ of a grain every three hours. Heidenhain [f] records a very severe and prolonged case caused, as shown later at the operation and postmortem examination, by carcinoma of the pancreas. The spasms were greatly relieved by cocain administered by the mouth, as much as 15 grains being given in twelve hours. Laborde and Lépine [g] report the case of a young girl who was relieved of an obstinate case of hiccough lasting four days by traction on her tongue. After the tongue had been held out of the mouth for a few minutes the hiccoughs ceased. Laborde referred to two cases of a similar character reported by Viand.

Anomalous Sneezing.—In the olden times sneezing was considered a good omen; and was regarded as a sacred sign by nearly all of the ancient peoples. This feeling of reverence was already ancient in the days of Homer. Aristotle inquired into the nature and origin of the superstition, somewhat profanely wondering why sneezing had been deified rather than coughing. The Greeks traced the origin of the sacred regard for sneezing to the

[a] 533, 1884, xliv., 695. [b] 476, 1840–41, i., 295. [c] 318, 1835. [d] 632, Oct., 1894.
[e] 450, Oct. 27, 1894. [f] 199, June 11, 1884. [g] Quoted 533, March 28, 1896, 354.

days of Prometheus, who blessed his man of clay when he sneezed. According to Seguin the rabbinical account says that only through Jacob's struggle with the angel did sneezing cease to be an act fatal to man. Not only in Greece and Rome was sneezing revered, but also by races in Asia and Africa, and even by the Mexicans of remote times. Xenophon speaks of the reverence as to sneezing, in the court of the King of Persia. In Mesopotamia and some of the African towns the populace rejoiced when the monarch sneezed. In the present day we frequently hear "God bless you" addressed to persons who have just sneezed, a perpetuation of a custom quite universal in the time of Gregory the Great, in whose time, at a certain season, the air was filled with an unwholesome vapor or malaria which so affected the people that those who sneezed were at once stricken with death-agonies. In this strait the pontiff is said to have devised a form of prayer to be uttered when the paroxysm was seen to be coming on, and which, it was hoped, would avert the stroke of the death-angel.

There are some curious cases of anomalous sneezing on record, some of which are possibly due to affections akin to our present "hay fever," while others are due to causes beyond our comprehension. The Ephemerides records a paroxysm of continual sneezing lasting thirty days. Bonet,[216] Lancisi,[475] Fabricius Hildanus,[334] and other older observers speak of sneezing to death. Morgagni[576] mentions death from congestion of the vasa cerebri caused by sneezing. The Ephemerides records an instance of prolonged sneezing which was distinctly hereditary.

Ellison[a] makes an inquiry for treatment of a case of sneezing in a white child of ten. The sneezing started without apparent cause and would continue 20 or 30 times, or until the child was exhausted, and then stop for a half or one minute, only to relapse again. Beilby[b] speaks of a boy of thirteen who suffered constant sneezing (from one to six times a minute) for one month. Only during sleep was there any relief. The patient recovered under treatment consisting of active leeching, purgation, and blisters applied behind the ear, together with the application of olive oil to the nostrils.

Lee[c] reports a remarkable case of **yawning followed by sneezing** in a girl of fifteen who, just before, had a tooth removed without difficulty. Half an hour afterward yawning began and continued for five weeks continuously. There was no pain, no illness, and she seemed amused at her condition. There was no derangement of the sexual or other organs and no account of an hysteric spasm. Potassium bromid and belladonna were administered for a few days with negative results, when the attacks of yawning suddenly turned to sneezing. One paroxysm followed another with scarcely an interval for speech. She was chloroformed once and the sneezing ceased, but was more violent on recovery therefrom. Ammonium bromid in half-drachm doses, with rest in bed for psychologic reasons, checked the sneezing. Woakes[d] presented a

[a] Memphis Jour. Med. Sc., 1889, i., 100.

[b] 318, 1835.

1880, i., 253.

paper on what he designated "**ear-sneezing,**" due to the caking of cerumen in one ear. Irritation of the auricular branch of the vagus was produced, whence an impression was propagated to the lungs through the pulmonary branches of the vagus. Yawning was caused through implication of the third division of the 5th nerve, sneezing following from reflex implication of the spinal nerves of respiration, the lungs being full of air at the time of yawning. Woakes also speaks of "ear-giddiness" and offers a new associate symptom—superficial congestion of the hands and forearm.

A case of anomalous sneezing immediately prior to sexual intercourse is mentioned on page 511.

Hemophilia is an hereditary, constitutional fault, characterized by a tendency to uncontrollable bleeding, either spontaneous or from slight wounds. It is sometimes associated with a form of arthritis (Osler). This hemorrhagic diathesis has been known for many years; and the fact that there were some persons who showed a peculiar tendency to bleed after wounds of a trifling nature is recorded in some of the earliest medical literature. Only recently, however, through the writings of Buel, Otto, Hay, Coates, and others, has the hereditary nature of the malady and its curious mode of transmission through the female line been known. As a rule the mother of a hemophile is not a "bleeder" herself, but is the daughter of one. The daughters of a hemophile, though healthy and free from any tendency themselves, are almost certain to transmit the disposition to the male offspring. The condition generally appears after some slight injury in the first two years of life; but must be distinguished from the hemorrhagic affections of the new-born, which will be discussed later. The social condition of the family does not alter the predisposition; the old Duke of Albany was a "bleeder";[a] and bleeder families are numerous, healthy looking, and have fine, soft skins.

The duration of this tendency, and its perpetuation in a family, is remarkable. The Appleton-Swain family of Reading, Mass., has shown examples for two centuries. Osler has been advised of instances already occurring in the seventh generation. Kolster[b] has investigated hemophilia in women, and reports a case of bleeding in the daughter of a hemophilic woman. He also analyzes 50 genealogic trees of hemophilic families, and remarks that Nasse's law of transmission does not hold true. In 14 cases the transmission was direct from the father to the child, and in 11 cases it was direct from the mother to the infant.

The hemorrhagic symptoms of bleeders may be divided into external bleedings, either spontaneous or traumatic; interstitial bleedings, petechiæ, and ecchymoses; and the joint-affections. The external bleedings are seldom spontaneous, and generally follow cuts, bruises, scratches, and often result seriously. A minor operation on a hemophile may end in death; so slight an operation as drawing a tooth has been followed by the most disastrous consequences.

[a] 476, 1852, i., 360. [b] Finska Läkar. Handlingar, March, 1895.

Armstrong,[a] Blagden,[b] and Roberts,[c] have seen fatal hemorrhage after the extraction of teeth. MacCormac observed five bleeders at St. Thomas Hospital, London, and remarks that one of these persons bled twelve days after a tooth-extraction. Buchanan and Clay cite similar instances. Cousins[d] mentions an individual of hemorrhagic diathesis who succumbed to extensive extravasation of blood at the base of the brain, following a slight fall during an epileptic convulsion. Dunlap[e] reports a case of hemorrhagic diathesis, following suppression of the catamenia, attended by vicarious hemorrhage from the gums, which terminated fatally. Erichsen[f] cites an instance of extravasation of blood into the calf of the leg of an individual of hemophilic tendencies. A cavity was opened, which extended from above the knee to the heel; the clots were removed, and cautery applied to check the bleeding. There was extension of the blood-cavity to the thigh, with edema and incipient gangrene, necessitating amputation of the thigh, with a fatal termination.

Mackenzie[g] reports an instance of **hemophilic purpura of the retina,** followed by death. Harkin gives an account of vicarious bleeding from the under lip in a woman of thirty-eight. The hemorrhage occurred at every meal and lasted ten minutes. There is no evidence that the woman was of hemophilic descent.

Of 334 cases of bleeding in hemophilia collected by Grandidier, 169 were from the nose, 43 from the mouth, 15 from the stomach, 36 from the bowels, 16 from the urethra, 17 from the lungs, and a few from the skin of the head, eyelids, scrotum, navel, tongue, finger-tips, vulva, and external ear. Osler remarks that Professor Agnew knew of a case of a bleeder who had always bled from cuts and bruises above the neck, never from those below. The joint-affections closely resemble acute rheumatism. Bleeders do not necessarily die of their early bleedings, some living to old age. Oliver Appleton, the first reported American bleeder, died at an advanced age, owing to hemorrhage from a bed-sore and from the urethra. Fortunately the functions of menstruation and parturition are not seriously interfered with in hemophilia. Menstruation is never so excessive as to be fatal. Grandidier states that of 152 boy subjects 81 died before the termination of the seventh year. Hemophilia is rarely fatal in the first year.

Of the **hemorrhagic diseases of the new-born** three are worthy of note. In **syphilis hæmorrhagica neonatorum** the child may be born healthy, or just after birth there may appear extensive cutaneous extravasations with bleeding from the mucous surfaces and from the navel; the child may become deeply jaundiced. Postmortem examination shows extensive extravasations into the internal viscera, and also organic syphilitic lesions.

Winckel's disease, or epidemic hemoglobinuria, is a very fatal affection,

[a] Trans. Belfast Clin. and Path. Soc., 1854.
[b] 550, 1820.
[c] 476, 1841–42, i., 752.
[d] 548, 1869, ii., 277.
[e] 594, 1850, iv., 314.
[f] 476, 1856, i., 511.
[g] 548, 1877, i., 258.

sometimes epidemic in lying-in institutions; it develops about the fourth day after birth. The principal symptom is hematogenous icterus with cyanosis,—the urine contains blood and blood-coloring matter. Some cases have shown in a marked degree acute fatty degeneration of the internal organs —Buhl's disease.

Apart from the common visceral hemorrhages, the results of injuries at birth, bleeding from one or more of the surfaces is a not uncommon event in the new-born, particularly in hospital-practice. According to Osler Townsend reports 45 cases in 6700 deliveries, the hemorrhage being both general and from the navel alone. Bleeding also occurs from the bowels, stomach, and mouth, generally beginning in the first week, but in rare instances it is delayed to the second or third. Out of 50 cases collected by Townsend 31 died and 19 recovered. The nature of the disease is unknown, and post-mortem examination reveals no pathologic changes, although the general and not local nature of the affection, its self-limited character, the presence of fever, and the greater prevalence of the disease in hospitals, suggest an infectious origin (Townsend). Kent[a] speaks of a new-born infant dying of spontaneous hemorrhage from about the hips.

Infantile scurvy, or Barlow's disease, has lately attracted marked attention, and is interesting for the numerous extravasations and spontaneous hemorrhages which are associated with it. A most interesting collection of specimens taken from the victims of Barlow's disease were shown in London in 1895.[619]

In an article on the successful **preventive treatment of tetanus neonatorum,** or the "scourge of St. Kilda," of the new-born, Turner[b] says the first mention of trismus nascentium or tetanus neonatorum was made by Rev. Kenneth Macaulay in 1764, after a visit to the island of St. Kilda in 1758. This gentleman states that the infants of this island give up nursing on the fourth or fifth day after birth; on the seventh day their gums are so clinched together that it is impossible to get anything down their throats; soon after this they are seized with convulsive fits and die on the eighth day. So general was this trouble on the island of St. Kilda that the mothers never thought of making any preparation for the coming baby, and it was wrapped in a dirty piece of blanket till the ninth or tenth day, when, if the child survived, the affection of the mother asserted itself. This lax method of caring for the infant, the neglect to dress the cord, and the unsanitary condition of the dwellings, make it extremely probable that the infection was through the umbilical cord. All cases in which treatment was properly carried out by competent nurses have survived. This treatment consisted in dressing the cord with iodoform powder and antiseptic wool, the breast-feeding of the baby from the first, and the administration of one-grain doses of potassium bromid at short intervals. The infant death-rate on the island of St. Kilda has, conse-

[a] 476, 1868, ii., 487.

[b] 381, March, 1895.

quently, been much reduced. The author suggests the use of a new iodin-preparation called loretin for dressing the cord. The powder is free from odor and is nonpoisonous.

Human Parasites.—Worms in the human body are of interest on account of the immense length some species attain, the anomalous symptoms which they cause, or because of their anomalous location and issue. According to modern writers the famous Viennese collection of helminths contains chains of **tænia saginata** 24 feet long. The older reports, according to which the tænia solium (*i. e.*, generally the tænia saginata) grew to such lengths as 40, 50, 60, and even as much as 800 yards, are generally regarded as erroneous. The observers have apparently taken the total of all the fragments of the worm or worms evacuated at any time and added them, thus obtaining results so colossal that it would be impossible for such an immense mass to be contained in any human intestine.

The name solium has no relation to the Latin *solus*, or *solium*. It is quite possible for a number of **tapeworms** to exist simultaneously in the human body. Palm [a] mentions the fact of four tapeworms existing in one person; and Mongeal [b] has made observations of a number of cases in which several teniæ existed simultaneously in the stomach. David [c] speaks of the expulsion of five teniæ by the ingestion of a quantity of sweet wine. Cobbold [d] reports the case of four simultaneous tapeworms; and Aguiel [e] describes the case of a man of twenty-four who expelled a mass weighing a kilogram, 34.5 meters long, consisting of several different worms. Garfinkel [812] mentions a case which has been extensively quoted,[f] of a peasant who voided 238 feet of tapeworms, 12 heads being found. Laveran [g] reports a case in which 23 teniæ were expelled in the same day. Greenhow [h] mentions the occurrence of two tæniæ mediocanellata.

The size of a tapeworm in a small child is sometimes quite surprising. Even the new-born have exhibited signs of teniæ, and Haussmann [i] has discussed this subject. Armor [j] speaks of a fully-matured tapeworm being expelled from a child five days old. Kennedy [k] reports cases in which tapeworms have been expelled from infants five, and five and one-half months old. Heisberg [l] gives an account of a tapeworm eight feet in length which came from a child of two. Twiggs [m] describes a case in which a tapeworm 36 feet long was expelled from a child of four; and Fabre [n] mentions the expulsion of eight teniæ from a child. Occasionally the tapeworm is expelled from the mouth. Such cases are mentioned by Hitch [o] and Martel.[p] White [q] speaks of a tapeworm which was discharged from the stomach

[a] 476, 1885, ii., 991. [b] 162, 1840, 310. [c] 368, 1843, xi., 41.
[d] 476, 1885, ii., 566. [e] 728, 1883. [f] 476, 1885, ii., 1221.
[g] Arch. de méd. et pharm. mil., Paris, 1885, v., 173. [h] 476, 1863, ii., 699.
[i] 224, 1872, ii., 466. [j] 597, 1871, xiv., 518.
[k] "Proceedings of the Pathological Society of Dublin," 1885-87.
[l] 538, Nov. 24, 1878. [m] 744, 1847, iii., 413. [n] 368, 1887, v., 447.

after the use of an emetic. Lile [a] mentions the removal of a tapeworm which had been in the bowel twenty-four years.

The peculiar effects of a tapeworm are exaggerated appetite and thirst, nausea, headaches, vertigo, ocular symptoms, cardiac palpitation, and Mursinna [b] has even observed a case of trismus, or lockjaw, due to tænia solium. Féréol [c] speaks of a case of vertigo, accompanied with epileptic convulsions, which was caused by teniæ. On the administration of kousso three heads were expelled simultaneously. There is a record of an instance of cardiac pulsation rising to 240 per minute, which ceased upon the expulsion of a large tapeworm.[d] It is quite possible for the presence of a tapeworm to indirectly produce death. Garroway [e] describes a case in which death was apparently imminent from the presence of a tapeworm. Kisel [f] has recorded a fatal case of anemia, in a child of six, dependent on teniæ.

The number of **ascarides** or **round-worms** in one subject is sometimes enormous. Victor [g] speaks of 129 round-worms being discharged from a child in the short space of five days. Pole [h] mentions the expulsion of 441 lumbricoid worms in thirty-four days, and Fauconneau-Dufresne [i] has reported a most remarkable case in which 5000 ascarides were discharged in less than three years, mostly by vomiting. The patient made an ultimate recovery.

There are many instances in which the lumbricoid worms have pierced the intestinal tract and made their way to other viscera, sometimes leading to an anomalous exit. There are several cases on record in which the lumbricoid worms have been found in the bladder. Paré speaks of a case of this kind during a long illness; and there is mention [j] of a man who voided a worm half a yard long from his bladder after suppression of urine. The Ephemerides contains a curious case in which a stone was formed in the bladder, having for its nucleus a worm. Fontanelle presented to the Royal Academy of Medicine of Paris several yards of tapeworm passed from the urethra of a man of fifty-three. The following is a quotation from the British Medical Journal: [k] "I have at present a patient passing in his urine a worm-like body, not unlike a tapeworm as far as the segments and general appearance are concerned, the length of each segment being about ¼ inch, the breadth rather less; sometimes 1½ segments are joined together. The worm is serrated on the one side, each segment having 1½ cusps. The urine pale, faintly acid at first, within the last week became almost neutral. There was considerable vesical irritation for the first week, with abundant mucus in the urine; specific gravity was 1010; there were no albumin nor tube-casts nor uric acid

[a] 545, 1890, 42.
[b] Lond. Med. Rev. and Mag., 1799–1800, ii., 290.
[c] 237, 1876, 172.
[d] 224, June, 1867.
[e] 224, 1868, ii., 221.
[f] Trudi. obsch. dietsk vrach, St. Petersburg, 1869, ii., 67.
[g] 435, 1885, 319.
[h] Med. Chron., Balt., 1882–83, i., 184.
[i] 789, 1880, 186.
[j] 629, 1700, 135.
[k] 224, 1895, ii., 512.

in the urinary sediments. Later there were pus-cells and abundant pus. Tenderness existed behind the prostate and along the course of left ureter. Temperature of patient oscillated from 97.5° to 103.2° F. There was no history at any time of recto-vesical fistula. Can anyone suggest the name, etc., of this helminth?"

Other cases of worms in the bladder are mentioned in Chapter XIII.

Mitra [a] speaks of the passage of round-worms through the umbilicus of an adult; and there is a case mentioned [b] in which round-worms about seven inches long were voided from the navel of a young child. Borgeois [c] speaks of a lumbricoid worm found in the biliary passages, and another in the air passages.

Turnbull [d] has recorded two cases of perforation of the tympanic membrane from lumbricoides. Dagan [e] speaks of the issue of a lumbricoid from the external auditory meatus. Laughton [f] reports an instance of lumbricoid in the nose. Rake [g] speaks of asphyxia from a round-worm. Morland [h] mentions the ejection of numerous lumbricoid worms from the mouth.

Worms have been found **in the heart**; and it is quite possible that in cases of **trichinosis,** specimens of the trichinæ may be discovered anywhere in the line of cardiac or lymphatic circulation. Quoted by Fournier, [302] Lapeyronnie has seen worms in the pericardial sac, and also in the ventricle. There is an old record of a person dying of intestinal worms, one of which was found in the left ventricle.[i] À Castro and Vidal speak of worms in the aorta. Rake [j] reports a case of sudden death from round-worm; and Brown [k] has noted a similar instance.

The **echinococcus** is a tiny cestode which is the factor in the production of the well-known hydatid cysts which may be found in any part of the body. Delafield and Prudden report the only instance of multilocular echinococcus seen in this country. Their patient was a German who had been in this country five years. There are only about 100 of these cases on record, most of them being in Bavaria and Switzerland.

The **filaria sanguinis hominis** is a small worm of the nematode species, the adult form of which lives in the lymphatics, and either the adult or the prematurely discharged ova (Manson) block the lymph-channels, producing the conditions of hematochyluria, elephantiasis, and lymph-scrotum. The Dracunculus medinensis or Guinea-worm is a widely-spread parasite in parts of Africa and the West Indies. According to Osler several cases have occurred in the United States. Jarvis reports a case in a post-chaplain who had lived at Fortress Monroe, Va., for thirty years. Van Harlingen's patient, a man of forty-seven, had never lived out of Philadelphia, so that the worm must be included among the parasites infesting this country.

[a] 436, 1891, ii., 381. [b] Lond. Med. Jour., 1786, vii., 372. [c] 789, 1856, x., 279.
[d] 545, 1881, 32. [e] Jour. de méd. et chir. prat., Paris, 1883, 258.
[f] 547, 1870–71, i., 181. [g] 224, 1887, i., 1274. [h] 218, 1867, 409.
[i] 469, 1772. [j] 703, 1890, 26. [k] 776, 1824, i., 663.

In February, 1896, Henry of Philadelphia showed microscopic slides containing blood which was infested with numbers of living and active filaria embryos. The blood was taken from a colored woman at the Woman's Hospital, who developed hematochyluria after labor. Henry believed that the woman had contracted the disease during her residence in the Southern States.

Curran [a] gives quite an exhaustive article on the disease called in olden times "**eaten of worms,**"—a most loathsome malady. Herod the Great, the Emperor Galerius, and Philip II. of Spain perished from it. In speaking of the Emperor Galerius, Dean Milman, in his "History of Latin Christianity," [b] says, "a deep and fetid ulcer preyed on the lower parts of his body and ate them away into a mass of living corruption." Gibbon, in his "Decline and Fall," [c] also says that "his (Galerius's) death was caused by a very painful and lingering disorder. His body, swelled by an intemperate course of life to an unwieldy corpulence, was covered with ulcers and devoured by immense swarms of those insects who have given their names to this most loathsome disease." It is also said that the African Vandal King, the Arian Huneric, died of the disease. Antiochus, surnamed the "Madman," [d] was also afflicted with it; and Josephus makes mention of it as afflicting the body of Herod the Great. The so-called "King Pym" died of this "morbus pedicularis," but as prejudice and passion militated against him during his life and after his death, this fact is probably more rumor than verity. A case is spoken of by Curran, which was seen by an army-surgeon in a very aged woman in the remote parts of Ireland, and another in a female in a dissecting-room in Dublin. The tissues were permeated with lice which emerged through rents and fissures in the body.

Instances of the larvæ of the estrus or the **bot-fly** in the skin are not uncommon. In this country Allen [e] removed such larvæ from the skin of the neck, head, and arm of a boy of twelve. Bethune, Delavigne, Howship, Jacobs, Jannuzzi, and others, report similar cases. These flesh-flies are called creophilæ, and the condition they produce is called myiosis. According to Osler, in parts of Central America, the eggs of a bot-fly, called the dermatobia, are not infrequently deposited in the skin, and produce a swelling very like the ordinary boil. Matas has described a case in which the estrus larvæ were found in the gluteal region. Finlayson of Glasgow has recently reported an interesting case in a physician who, after protracted constipation and pain in the back and sides, passed large numbers of the larvæ of the flower-fly, anthomyia canicularis, and there are other instances of myiosis interna from swallowing the larvæ of the common house-fly.

There are forms of nasal disorder caused by larvæ, which some native surgeons in India regard as a chronic and malignant ulceration of the mucous

[a] 536, 1886, ii., 142. [b] Vol. i., 227. [c] Vol. ii., 122.
[d] Maccabes, ch. ix., verses 1, 5, 9, and 10. [e] 218, lxxxvii., 306.

membranes of the nose and adjacent sinuses in the debilitated and the scrofulous. Worms lodging in the cribriform plate of the ethmoid feed on the soft tissues of that region. Eventually their ravages destroy the olfactory nerves, with subsequent loss of the sense of smell, and they finally eat away the bridge of the nose. The head of the victim droops, and he complains of crawling of worms in the interior of the nose. The eyelids swell so that the patient cannot see, and a deformity arises which exceeds that produced by syphilis. Lyons[a] says that it is one of the most loathsome diseases that comes under the observation of medical men. He describes the disease as "essentially a scrofulous inflammation of the Schneiderian membrane, . . . which finally attacks the bones." Flies deposit their ova in the nasal discharges, and from their infection maggots eventually arise. In Sanskrit *peenash* signifies disease of the nose, and is the Indian term for the disease caused by the deposition of larvæ in the nose. It is supposed to be more common in South America than in India.

[a] Indian Annals of Medicine, Oct., 1885.

CHAPTER XVI.

ANOMALOUS SKIN-DISEASES.

Ichthyosis is a disease of the skin characterized by a morbid development of the papillæ and thickening of the epidermic lamellæ; according as the skin is affected over a larger or smaller area, or only the epithelial lining of the follicles, it is known as ichthyosis diffusa, or ichthyosis follicularis. The hardened masses of epithelium develop in excess, the epidermal layer loses in integrity, and the surface becomes scaled like that of a fish. Ichthyosis may be congenital, and over sixty years ago Steinhausen[a] described a fetal monster in the anatomic collection in Berlin, the whole surface of whose body was covered with a thick layer of epidermis, the skin being so thick as to form a covering like a coat-of-mail. According to Rayer the celebrated "**porcupine-man**" who exhibited himself in England in 1710 was an example of a rare form of ichthyosis. This man's body, except the face, the palms of the hands, and the soles of the feet, was covered with small excrescences in the form of prickles. These appendages were of a reddish-brown color, and so hard and elastic that they rustled and made a noise when the hand was passed over their surfaces. They appeared two months after birth and fell off every winter, to reappear each summer. In other respects the man was in very good health. He had six children, all of whom were covered with excrescences like himself. The hands of one of these children has been represented by Edwards in his "Gleanings of Natural History." A picture of the hand of the father is shown in the fifty-ninth volume of the Philosophical Transactions.

Pettigrew[b] mentions a man with warty elongations encasing his whole body. At the parts where friction occurred the points of the elongations were worn off. This man was called "**the biped armadillo.**" His great grandfather was found by a whaler in a wild state in Davis's Straits, and for four generations the male members of the family had been so encased. The females had normal skins. All the members of the well-known family of Lambert had the body covered with spines. Two members, brothers, aged twenty-two and fourteen, were examined by Geoffroy-Saint-Hilaire. This thickening of the epidermis and hair was the effect of some morbid predisposition which was transmitted from father to son, the daughters not being affected. Five generations could be reckoned which had been affected in the manner described.

[a] 368, 1831, T. ii., 10.

[b] 476, 1832, ii., 146.

The "porcupine-man" seen by Baker contracted small-pox, and his skin was temporarily freed from the squamæ, but these reappeared shortly afterward. There are several older records of prickly men or porcupine-men. Ascanius[a] mentions a porcupine-man, as do Buffon and Schreber. Autenreith speaks of a porcupine-man who was covered with innumerable verrucæ. Martin[b] described a remarkable variety of ichthyosis in which the

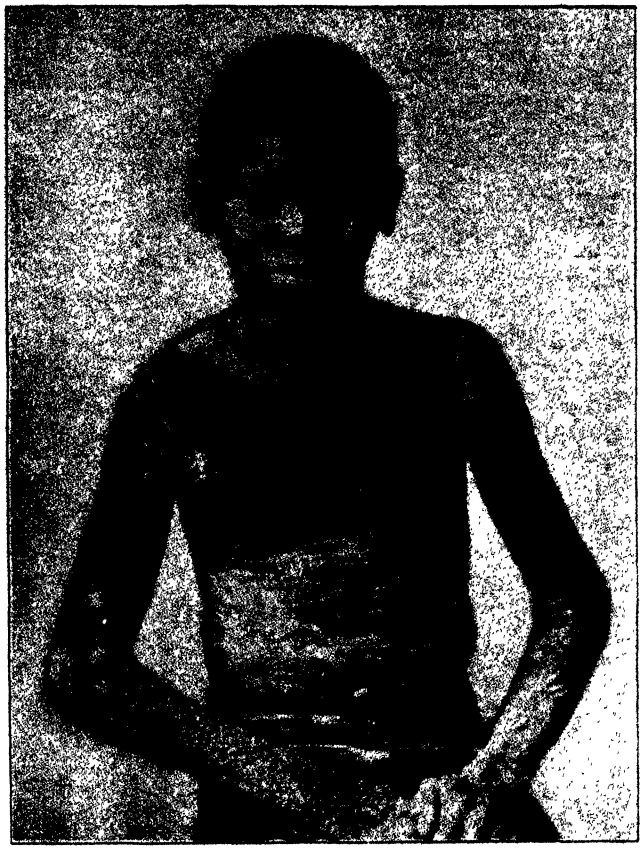


Fig. 286.—An alligator-boy.

skin was covered with strong hairs like the bristles of a boar. When numerous and thick the scales sometimes assumed a greenish-black hue. An example of this condition was the individual who exhibited under the name of the "**alligator-boy.**" Figure 286 represents an "alligator-boy" exhibited by C. T. Taylor. The skin affected in this case resembled in color and consistency that of a young alligator. It was remarked that his olfactory sense was intact.

[a] 462, T. iv., 216. [b] 550, ix., part i., 53.

The harlequin fetus, of which there are specimens in Guy's Hospital, London Hospital, and the Royal College of Surgeons Museum, is the result of ichthyosis congenita. According to Crocker either after the removal of the vernix caseosa, which may be thick, or as the skin dries it is noticeably red, smooth, shiny, and in the more severe cases covered with actual plates. In the harlequin fetus the whole surface of the body is thickly covered with fatty epidermic plates, about $\frac{1}{16}$ inch in thickness, which are broken up by horizontal and vertical fissures, and arranged transversely to the surface of the body like a loosely-built stone wall. After birth these fissures may extend down into the corium, and on movement produce much pain. The skin is so stiff and contracted that the eyes cannot be completely opened or shut, the lips are too stiff to permit of sucking, and are often inverted; the nose and ears are atrophied, the toes are contracted and cramped, and, if not born dead, the child soon dies from starvation and loss of heat. When the disease is less severe the child may survive some time. Crocker had a patient, a male child one month old, who survived three months. Hallopeau and Elliot also report similar cases.

Contagious follicular keratosis is an extremely rare affection in which there are peculiar, spine-like outgrowths, consisting in exudations of the mouths of the sebaceous glands. Leloir and Vidal shorten the name to **acné cornée.**

Erasmus Wilson speaks of it as ichthyosis sebacea cornea. H. G. Brooke describes a case in a girl of six. The first sign had been an eruption of little black spots on the nape of the neck. These spots gradually developed into papules, and the whole skin took on a dirty yellow color. Soon afterward the same appearances occurred on both shoulders, and, in the same order, spread gradually down the outer sides of the arms—first black specks, then papules, and lastly pigmentation. The black specks soon began to project, and comedo-like plugs and small, spine-like growths were produced. Both the spines and plugs were very hard and firmly-rooted. They resisted firm pressure with the forceps, and when placed on sheets of paper rattled like scraps of metal. A direct history of contagion was traced from this case to others.

Mibelli[a] describes an uncommon form of **keratodermia** (porokeratosis). The patient was a man of twenty-one, and exhibited the following changes in his skin: On the left side of the neck, beyond a few centimeters below the lobe of the ear, there were about ten small warty patches, irregularly scattered, yellowish-brown in color, irregular in outline, and varying in size from a lentil to a half-franc piece, or rather more. Similar patches were seen on other portions of the face. Patches of varying size and form, sharply limited by a kind of small, peripheral "dike," sinuous but uninterrupted, of a color varying from red to whitish-red, dirty white, and to a hue but little different

[a] "International Atlas of Rare Skin-Diseases."

from that of the healthy skin. Similar patches were seen on the right hand, and again on the back of the right hand was a wide space, prolonged upward in the form of a broad band on the posterior surface of the forearm to just below the olecranon, where the skin was a little smoother and thinner than the surrounding skin, and altogether bare of hairs. The disease was noticed at the age of two, and gradually progressed. The patient always enjoyed the most perfect health, but had contracted syphilis three years before. A brother of the patient, aged twenty-four, for sixteen years has had the same skin-affection as this patient, on the back of the hand, and the sister and father had noticed similar lesions.

Diffuse symmetric scleroderma, or **hide-bound disease,** is quite rare, and presents itself in two phases: that of infiltration (more properly called hypertrophy) and atrophy, caused by shrinkage. The whole body may be involved, and each joint may be fixed as the skin over it becomes rigid. The muscles may be implicated independently of the skin, or simultaneously, and they give the resemblance of rigor mortis. The whole skin is so hard as to suggest the idea of a frozen corpse, without the coldness, the temperature being only slightly subnormal. The skin can neither be pitted nor pinched. As Crocker has well put it, when the face is affected it is gorgonized, so to speak, both to the eye and to the touch. The mouth cannot be opened; the lids usually escape, but if involved they are half closed, and in either case immovable. The effect of the disease on the chest-walls is to seriously interfere with the respiration and to flatten and almost obliterate the breasts; as to the limbs, from the shortening of the distended skin the joints are fixed in a more or less rigid position. The mucous membranes may be affected, and the secretion of both sweat and sebum is diminished in proportion to the degree of the affection, and may be quite absent. The atrophic type of scleroderma is preceded by an edema, and from pressure-atrophy of the fat and muscles the skin of the face is strained over the bones; the lips are shortened, the gums shrink from the teeth and lead to caries, and the nostrils are compressed. The strained skin and the emotionless features (relieved only by telangiectatic striæ) give the countenance a ghastly, corpse-like aspect. The etiology and pathology of this disease are quite obscure. Happily the prognosis is good, as there is a tendency to spontaneous recovery, although the convalescence may be extended.

Although regarded by many as a disease distinct from scleroderma, **morphea** is best described as a circumscribed scleroderma, and presents itself in two clinical aspects: patches and bands, the patches being the more common.

Scleroderma neonatorum is an induration of the skin, congenital and occurring soon after birth, and is invariably fatal. A disease somewhat analogous is edema neonatorum, which is a subcutaneous edema with induration affecting the new-born. If complete it is invariably fatal, but in a few cases in which the process has been incomplete recovery has occurred.

Gerard[a] reports recovery from a case of sclerema neonatorum in an infant five weeks old, which seemed in perfect health but for this skin-affection. The back presented a remarkable induration which involved the entire dorsal aspect, including the deltoid regions, the upper arms, the buttocks, and the thighs, down to and involving the popliteal spaces. The edges of the indurated skin were sharply defined, irregular, and map-like. The affected skin was stretched, but not shiny, and exhibited a pink mottling; it could not be pinched between the fingers; pressure produced no pitting, but rendered the surface pale for a time. The induration upon the buttocks had been noticed immediately after birth, and the region was at first of a deep pink color. During the first nine days the trouble had extended to the thighs, but only shortly before the examination had it attacked the arms. Inunctions of cod-liver oil were at first used, but with little improvement. Blue ointment was substituted, and improvement commenced. As the induration cleared up, outlying patches of the affected skin were left surrounded by normal integument. No pitting could be produced even after the tension of the skin had decreased during recovery. The lowest rectal temperature was 98° F. In a little more than four months the skin became normal. The treatment with mercurial ointment was stopped some time before recovery.

Possibly the most interesting of the examples of skin-anomaly was the "**elephant-man**" of London (Figs. 287 and 288). His real name was Merrick. He was born at Leicester, and gave an elaborate account of shock experienced by his mother shortly before his birth, when she was knocked down by an elephant at a circus; to this circumstance he attributed his unfortunate condition. He derived his name from a proboscis-like projection of his nose and lips, together with a peculiar deformity of the forehead. He was victimized by showmen during his early life, and for a time was shown in Whitechapel Road, where his exhibition was stopped by the police. He was afterward shown in Belgium, and was there plundered of all his savings. The gruesome spectacle he presented ostracized him from the pleasures of friendship and society, and sometimes interfered with his travels. On one occasion a steamboat captain refused to take him as a passenger. Treves exhibited him twice before the Pathological Society of London.[b] His affection was not elephantiasis, but a complication of congenital hypertrophy of certain bones and pachydermatocele and papilloma of the skin. From his youth he suffered from a disease of the left hip-joint. The papillary masses developed on the skin of the back, buttock, and occiput. In the right pectoral and posterior aspect of the right axillary region, and over the buttocks, the affected skin hung in heavy pendulous flaps. His left arm was free from disease. His head grew so heavy that at length he had great difficulty in holding it up. He slept in a sitting or crouching position, with his hands clasped over his legs, and his head on his knees. If he lay down flat, the

[a] 476, May 4, 1895. [b] 224, 1890, i., 916.

heavy head showed a tendency to fall back and produce a sense of suffocation. For a long time he was an inmate of the London Hospital, where special quarters were provided for him, and it was there that he was found dead,

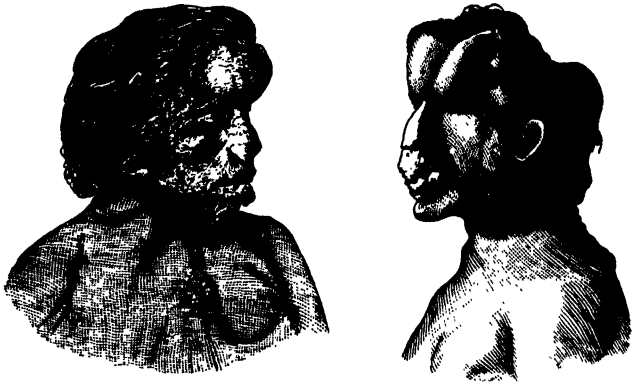


Fig. 287.—Head of the "Elephant-man."

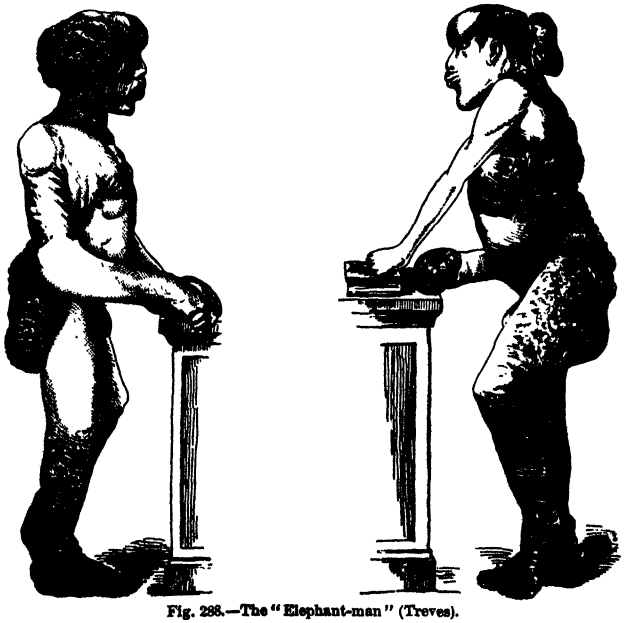


Fig. 288.—The "Elephant-man" (Treves).

April 11, 1890; while in bed his ponderous head had fallen backward and dislocated his neck.

Ainhum may be defined as a pathologic process, the ultimate result of which is a spontaneous amputation of the little toe. It is confined almost

exclusively to negroes, chiefly males, and of African descent. In Brazil it is called "ainham" or "quigila." "Ainham" literally means to saw, and is doubtless a colloquial name derived from a supposed slow, sawing process. The Hindoo name for it is "sukha pakla," meaning dry suppuration.

In 1866 da Silva Lima of Bahia, at the Misericordia Hospital, gave the first reports of this curious disease, and for quite a period it was supposed to be confined to Brazilian territory. Since then, however, it has been reported from nearly every quarter of the globe. Relative to its geographic distribution, Pyle[a] states that da Silva Lima and Seixas of Bahia have reported numerous cases in Brazil, as have Figueredo, Pereira, Pirovano, Alpin, and Guimares. Toppin reports it in Pernambuco. Mr. Milton reports a case from Cairo, and Dr. Creswell at Suez, both in slaves. E. A. G. Doyle reports several cases at the Fernando Hospital, Trinidad. Digby reports its prevalence on the west coast of Africa, particularly among a race of negroes called Krumens. Messum reports it in the South African Republic, and speaks of its prevalence among the Kaffirs. Eyles reports it on the Gold Coast. It has also been seen in Algiers and Madagascar. Through the able efforts of Her Majesty's surgeons in India the presence of ainhum has been shown in India, and considerable investigation made as to its etiology, pathologic histology, etc. Wise at Dacca, Smyth and Crombie at Calcutta, Henderson at Bombay, and Warden, Sen, Crawford, and Cooper in other portions of Southern India have all rendered assistance in the investigation of ainhum. In China a case has been seen, and British surgeons speak of it as occurring in Ceylon. Von Winckler presents an admirable report of 20 cases at Georgetown, British Guiana. Dr. Potoppidan sends a report of a case in a negress on St. Thomas Island. The disease has several times been observed in Polynesia.

Dr. Hornaday reports a case in a negress from North Carolina, and, curious to relate, Horwitz of Philadelphia and Shepherd of Canada found cases in negroes both of North Carolina antecedents. Dr. James Evans reports a case in a negro seventy-four years of age, at Darlington, S. C. Dr. R. H. Days of Baton Rouge, La., had a case in a negress, and Dr. J. L. Deslates, also of Louisiana, reports four cases in St. James Parish. Pyle has seen a case in a negress aged fifty years, at the Emergency Hospital in Washington.

So prevalent is the disease in India that Crawford found a case in every 2500 surgical cases at the Indian hospitals. The absence of pain or inconvenience in many instances doubtless keeps the number of cases reported few, and again we must take into consideration the fact that the class of persons afflicted with ainhum are seldom brought in contact with medical men.

The disease usually affects the 5th phalanx at the interphalangeal joint. Cases of the 4th and other phalanges have been reported. Cooper speaks of

[a] 533, Jan. 26, 1895.

a young Brahman who lost his left great toe by this process. Crombie speaks of a simultaneous amputation of both fourth toes. Potoppidan reports a similar case in a negress on St. Thomas Island. Sen reports a case in a supernumerary digit in a child, whose father, a Hindoo, lost a toe by ainhum. Eyles reports a case in a negro in whom the second finger was affected. Mirault, at Angiers, speaks of a case in which two fingers were lost in fifteen days, a fact which makes his diagnosis dubious. Béranger-Ferraud has seen all the toes amputated, and there is a wax model by Baretta, Paris, in the Army Medical Museum at Washington, in which all the toes of the right foot have been amputated, and the process is fast making progress at the middle third of the leg.

Ainhum is much more common in males than in females; it is, in fact, distinctly rare in the latter. Of von Winckler's 20 cases all were males.

Fig. 289.

Ainhum (dorsal surface). Plantar surface (Ohmann-Dumesnil).

It may occur at any age, but is most common between thirty and thirty-five. It has been reported in utero by Guyot, and was seen to extend up to the thigh, a statement that is most likely fallacious. However, there are well-authenticated cases in infants, and again in persons over seventy years of age.

In some few cases the metatarso-phalangeal joint is affected; but no case has been seen at the base of the ungual phalanx. The duration of the disease is between two and four years, but Dr. Evans's case had been in progress fifty years. It rarely runs its full course before a year.

Ainhum begins as a small furrow or crack, such as soldiers often experience, at the digito-plantar fold, seen first on the inner side. This process of furrowing never advances in soldiers, and has been given a name more expressive than elegant. In ainhum the toe will swell in a few days, and a pain, burning or shooting in nature, may be experienced in the foot and leg affected. Pain, however, is not constant. There may be an erythematous

eruption accompanying the swelling. The furrow increases laterally and in depth, and meets on the dorsal aspect of the toe, giving the toe the appearance of being constricted by a piece of fine cord. As the furrow deepens the distal end of the toe becomes ovoid, and soon an appearance as of a marble attached to the toe by a fibrous pedicle presents itself. By this time the swelling, if any, has subsided. The distal end of the toe bends under the foot, and becomes twisted when walking, and causes inconvenience, and, unfortunately, says Eyles, it is in this last stage only that the Fanti presents himself. There is in the majority of cases a small ulcer in or near the digito-plantar fold, which causes most of the pain, particularly when pressed upon. This ulcer does not occur early, and is not constant. The case under Pyle's observation showed no ulceration, and was absolutely painless, the negress applying for diagnosis rather than treatment. The furrow deepens until spontaneous amputation takes place, which rarely occurs, the patient generally hastening the process by his own operation, or by seeking surgical treatment. A dry scab forms at the furrow, and when picked and repicked constantly re-forms, being composed of horny desquamation or necrosis.

The *histology* of ainhum shows it to be a direct ingrowth of epithelium, with a corresponding depression of surface due to a rapid hyperplasia that pushes down and strangles the papillæ, thus cutting off the blood supply from the epithelial cells, causing them to undergo a horny change.

The disease is not usually symmetric, as formerly stated, nor is it simultaneous in different toes. There are no associated constitutional symptoms, no tendency to similar morbid changes in other parts, and no infiltration elsewhere. There is little or no edema with ainhum. In ainhum there is, first, simple hypertrophy, then active hyperplasia. The papillæ degenerate when deprived of blood supply, and become horny. Meanwhile the pressure thus exerted on the nervi vasorum sets up vascular changes which bring about epithelial changes in more distant areas, the process advancing anteriorly, that is, in the direction of the arteries. This makes the cause, according to Eyles, an inflammatory and trophic phenomenon due mainly to changes following pressure on the vasomotor nerves.

Etiology.—The theories of the causation of ainhum are quite numerous. The first cause is the admirable location for a furrow in the digito-plantar fold, and the excellent situation of the furrow for the entrance of sand or other particles to make the irritation constant, thus causing chronic inflammatory changes, which are followed subsequently by the changes peculiar to ainhum. The cause has been ascribed to the practice of wearing rings on the toes; but von Winckler says that in his locality (British Guinea) this practice is confined to the coolie women, and in not one of his 20 cases had a ring been previously worn on the toe; in fact all of the patients were males. Digby says, however, that the Krumens, among whom the disease is common, have long worn brass or copper rings on the fifth toe. Again the

natives of India, who are among those most frequently afflicted, have no such custom.

Injury, such as stone-bruise, has been attributed as the initial cause, and well-authenticated cases have been reported in which traumatism is distinctly remembered; but Smyth, Weber, and several other observers deny that habits, accidents, or work, are a feature in causation.

Von Düring reports a curious case which he calls **sclerodactylia annularis ainhumoides.** The patient was a boy about twelve years old, born in Erzeroum, brought for treatment for scabies, and not for the affection about to be described. A very defective history led to the belief that a similar affection had not been observed in the family. When he was six years old it began on the terminal phalanges of the middle fingers. A myxomatous swelling attacked the phalanges and effected a complete absorption of the terminal phalanx. It did not advance as far as gangrene or exfoliation of bone. At the time of report the whole ten fingers were involved; the bones seemed to be thickened, the soft parts being indurated or sclerosed. In the right index finger a completely sclerosed ring passed around the middle phalanx. The nails on the absorbed phalanges had become small and considerably thickened plates. No analogous changes were found elsewhere, and sensation was perfectly normal in the affected parts. There were no signs whatever of a multiple neuritis nor of a leprous condition.

There is a rare and curious condition known as "**deciduous skin**" or **keratolysis,** in which the owners possess a skin, which, like that of a serpent, is periodically cast off, that of the limbs coming off like the finger of a glove. Preston[a] of Canterbury, New Zealand, mentions the case of a woman who had thus shed her skin every few weeks from the age of seven or even earlier. The woman was sixty-seven years of age; the skin in every part of the body came away in casts and cuticles which separated entire and sometimes in one unbroken piece like a glove or stocking. Before each paroxysm she had an associate symptom of malaise. Even the skin of the nose and ears came off complete. None of the patient's large family showed this idiosyncrasy, and she said that she had been told by a medical man that it had been due to catching cold after an attack of small-pox. Frank[b] mentions a case in which there was periodic and complete shedding of the cuticle and nails of the hands and feet, which was repeated for thirty-three consecutive years on July 24th of each year, and between the hours of 3 P. M. and 9 P. M. The patient remembered shedding for the first time while a child at play. The paroxysms always commenced abruptly, constitutional febrile symptoms were first experienced, and the skin became dry and hot. The acute symptoms subsided in three or four hours and were entirely gone in twelve hours, with the exception of the redness of the skin, which did not disappear for thirty-six hours more. The patient had been delirious during this

[a] 476, Oct, 22, 1881. [b] 124, July, 1891.

period. The cuticle began to shed some time between the third and twelfth day, in large sheets, as pictured in the accompanying illustrations (Figs. 290 and 291). The nails were shed in about four weeks after the acute stage. Crocker had an instance of this nature in a man with tylosis palmæ, in which the skin was cast off every autumn, but the process lasted two months. Lang observed a case in which the fingers alone were affected.

There is a case of **general and habitual desquamation** of the skin in the Ephemerides of 1686; and Newell[a] records a case which recovered under the use of Cheltenham water for several seasons. Latham[b] describes a man of fifty who was first seized about ten years previously with a singular kind of fever, and this returned many times afterward, even twice in the course of the same year, attended with the same symptoms and circumstances, and appearing to be brought on by obstructed perspiration, in consequence of catching cold. Besides the common febrile symptoms, upon the invasion of the disease his skin universally itched, more especially at the joints, and the itching was followed by many little red spots, with a small degree of swelling. Soon after this his fingers became stiff, hard, and painful at the ends, and at the roots of the nails. In about twenty-four hours the cuticle began to separate from the cutis, and in ten or twelve days this separation was general from head to foot, during which time he completely turned the cuticle off from the wrists to the fingers' ends like a glove, and in like manner on the legs to the toes, after which his nails shot gradually from their roots, at first with exquisite pain, which abated as the separation of the cuticle advanced, and the old nails were generally thrown off by new ones in about six months. The cuticle rose in the palms and soles like blisters, having, however, no fluid beneath, and when it came off it left the underlying cutis exposed for a few days. Sometimes, upon catching cold, before quite free from feverish symptoms, a second separation of the cuticle from the cutis occurred, but it appeared so thin as to be like scurf, demonstrating the quick renewal of the parts.

There is a similar case in the Philosophical Transactions[c] in a miller of thirty-five who was exposed to great heat and clouds of dust. On the first cold a fever attacked him, and once or twice a year, chiefly in the autumn, this again occurred, attended with a loosening and detachment of the cuticle. The disorder began with violent fever, attended with pains in the head, back, limbs, retching, vomiting, dry skin, furred tongue, urgent thirst, constipation, and high-colored urine. Usually the whole surface of the body then became yellow. It afterward became florid like a rash, and then great uneasiness was felt for several days, with general numbness and tingling; the urine then began to deposit a thick sediment. About the third week from the first attack the cuticle appeared elevated in many places, and in eight or ten days afterward became so loose as to admit of its easy removal in large flakes. The cuticle of the hands, from the wrists to the fingers' ends, came off

[a] 490, iii., 576. [b] 629, lx., 451. [c] 629, lix., 281.

Fig. 290.—Skin-shedding

Fig. 291.—Casts of a case of skin-shedding (Frank).

like a glove. The patient was never disposed to sweat, and when it was attempted to force perspiration he grew worse; nor was he much at ease until his urine deposited a sediment, after which he felt little inconvenience but from the rigidity of the skin. The nails were not detached as in the previous case.

It is quite natural that such cases as this should attract the attention of the laity, and often find report in newspapers. The following is a lay-report of a "**snake-boy**" in Shepardstown, Va. :—

"Jim Twyman, a colored boy living with his foster-parents ten miles from this place, is a wonder. He is popularly known as the "snake-boy." Mentally he is as bright as any child of his age, and he is popular with his playmates, but his physical peculiarities are probably unparalleled. His entire skin, except the face and hands, is covered with the scales and markings of a snake. These exceptions are kept so by the constant use of Castile soap, but on the balance of his body the scales grow abundantly. The child sheds his skin every year. It causes him no pain or illness. From the limbs it can be pulled in perfect shape, but off the body it comes in pieces. His feet and hands are always cold and clammy. He is an inordinate eater, sometimes spending an hour at a meal, eating voraciously all the time, if permitted to do so. After these gorgings he sometimes sleeps two days. There is a strange suggestion of a snake in his face, and he can manipulate his tongue, accompanied by hideous hisses, as viciously as a serpent."

Under the name of **dermatitis exfoliativa neonatorum,** Ritter has described an eruption which he observed in the foundling asylum at Prague, where nearly 300 cases occurred in ten years. According to Crocker it begins in the second or third week of life, and occasionally as late as the fifth week, with diffuse and universal scaling, which may be branny or in laminæ like pityriasis rubra, and either dry or with suffusion beneath the epidermis. Sometimes it presents flaccid bullæ like pemphigus foliaceus, and then there are crusts as well as scales, with rhagades on the mouth, anus, etc.; there is a total absence of fever or other general symptoms. About 50 per cent. die of marasmus and loss of heat, with or without diarrhea. In those who recover the surface gradually becomes pale and the desquamation ceases. Opinions differ regarding it, some considering it of septic origin, while others believe it to be nothing but pemphigus foliaceus. Kaposi regards it as an aggravation of the physiologic exfoliation of the new-born. Elliott of New York[a] reports two cases with a review of the subject, but none have been reported in England. Cases on the Continent have been described by Billard, von Baer, Caspary, those already mentioned, and others.

The name **epidemic exfoliative dermatitis** has been given to an epidemic skin-disease which made its appearance in 1891 in England; 425 cases were collected in six institutions, besides sporadic cases in private houses.

[a] 124, Jan., 1888.

In 1895, in London,[619] some photographs and sketches were exhibited that were taken from several of the 163 cases which occurred in the Paddington Infirmary and Workhouse, under the care of Dr. Savill, from whose negatives they were prepared. They were arranged in order to illustrate the successive stages of the disorder. The eruption starts usually with discrete papules, often in stellate groups, and generally arranged symmetrically when on the limbs. These become fused into crimson, slightly raised maculæ, which in severe cases become further fused into red thickened patches, in which the papules can still be felt and sometimes seen. Vesicles form, and exudation occurs in only about one-third of the cases. Desquamation of the epidermis is the invariable feature of all cases, and it usually commences between the fourth and eighth days. In severe cases successive layers of the epidermis are shed, in larger or smaller scales, throughout the whole course of the malady. One-half of the epidermis shed from the hand of a patient is exhibited in this collection.

Of **sphaceloderma,** or **gangrene of the skin,** probably the most interesting is **Raynaud's disease** of symmetric gangrene, a vascular disorder, which is seen in three grades of intensity: there is local syncope, producing the condition known as dead-fingers or dead-toes, and analogous to that produced by intense cold; and local asphyxia, which usually follows local syncope, or may develop independently. Chilblains are the mildest manifestation of this condition. The fingers, toes, and ears, are the parts usually affected. In the most extreme degree the parts are swollen, stiff, and livid, and the capillary circulation is almost stagnant; this is local or symmetric gangrene, the mildest form of which follows asphyxia. Small areas of necrosis appear on the pads of the fingers and of the toes; also at the edges of the ears and tip of the nose. Occasional symmetric patches appear on the limbs and trunk, and in extensive cases terminate in gangrene. Raynaud suggested that the local syncope was produced by contraction of the vessels; the asphyxia is probably caused by a dilatation of the capillaries and venules, with persistence of the spasm of the arterioles. According to Osler two forms of congestion occur, which may be seen in adjacent fingers, one of which may be swollen, intensely red, and extremely hot; the other swollen, cyanotic, and intensely cold. Sometimes all four extremities are involved, as in Southey's case,[a] in a girl of two and a half in whom the process began on the calves, after a slight feverish attack, and then numerous patches rapidly becoming gangrenous appeared on the backs of the legs, thighs, buttocks, and upper arms, worse where there was pressure; the child died thirty-two hours after the onset. The whole phenomenon may be unilateral, as in Smith's case, quoted by Crocker,—in a girl of three years in whom the left hand was cold and livid, while on the right there was lividity, progressing to gangrene of the fingers and of the thumb up to the first knuckles, where complete separation occurred.

[a] 779, xxxiv., 286.

A considerable number of cases of apparently **spontaneous gangrene of the skin** have been recorded in medical literature as occurring generally in hysteric young women. Crocker remarks that they are generally classified as erythema gangrænosum, and are always to be regarded with grave suspicion of being self-induced. Ehrl[a] records an interesting case of this nature with an accompanying illustration. The patient was a girl of eighteen whose face, left breast, anus, legs, and feet became affected every autumn since her sixth year, after an attack of measles. At first the skin became red, then water-blisters formed, the size of a grain of corn, and in three days reaching the size of a hazel-nut; these burst and healed, leaving no scars. The menses appeared at the fifteenth year, lasted eight days, with great loss of blood, but there was no subsequent menstruation, and no vicarious hemorrhage. Afterward the right half of the face became red for three or four weeks, with a disturbance of the sensibility of this part, including the right half of the mucosa of the mouth and the conjunctiva of the right eye. At the seventeenth year the patient began to have a left-sided headache and increased sweating of the right half of the body. In 1892 the periodically-appearing skin-affection became worse. Instead of healing, the broken vessels became blackish and healed slowly, leaving ulcers, granulations, and scars, and the gangrenous tendency of the skin increased. Disturbance of the sight shortly intervened, associated with aphonia. The sensibility of the whole body, with the exception of the face, was greatly impaired, and there was true gangrene of the corium. A younger sister of the patient was similarly affected with symptoms of hysteria, hemianesthesia, etc.

Neuroses of the skin consist in augmentation of sensibility or **hyperesthesia** and diminution of sensibility or **anesthesia**. There are some curious old cases of loss of sensation. Ferdinandus[b] mentions a case of a young man of twenty-four who, after having been seized with insensibility of the whole body with the exception of the head, was cured by purgatives and other remedies. Bartholinus cites the case of a young man who lost the senses of taste and feeling; and also the case of a young girl who could permit the skin of her forehead to be pricked and the skin of her neck to be burned without experiencing any pain. In his "Surgery" Lamothe mentions a case of insensibility of the hands and feet in consequence of a horse-kick in the head without the infliction of any external wound. In the "Mémoires de l'Académie des Sciences" for the year 1743, we read an account of a soldier who, after having accidentally lost all sensation in his left arm, continued to go through the whole of the manual exercise with the same facility as ever. It was also known that La Condamine was able to use his hands for many years after they had lost their sensation. Rayer gives a case of paralysis of the skin of the left side of the trunk without any affection of the muscles, in a man of forty-three of apoplectic constitution. The paralysis extended from

[a] 838, May 3, 1894.

[b] Venetiis, 1612, Historia, 46.

the left mammary region to the haunch, and from the vertebræ to the linea alba. Throughout this whole extent the skin was insensible and could be pinched or even punctured without the patient being aware that he was even touched. The parts did not present any perceptible alteration in texture or in color. The patient was free from fever and made no complaint except a slight headache. Rayer quotes another case in a man of sixty who had been bitten three years previously by a dog that was not

Fig. 292.—Neuroma cutis dolorosum (Duhring).

mad. He was greatly frightened by the accident and every time he saw a dog he trembled violently, and on one occasion he suffered a convulsive attack for one and a half hours. The convulsions increased in number and frequency, he lost his memory, and exhibited other signs of incipient dementia. He was admitted to the hospital with two small wounds upon the head, one above the left eyebrow and the other on the scalp, occasioned by a fall on his entrance into the hospital. For several days a great degree of insensibility of the skin of the whole body was observed without any

implication of the power of voluntary motion. He was entirely cured in eighteen days.

Duhring[a] reports a very rare form of disease of the skin, which may be designated **neuroma cutis dolorosum,** or painful neuroma of the skin (Fig. 292). The patient was a boiler-maker of seventy who had no family history bearing on the disease. Ten years previously a few cutaneous tubercles the size and shape of a split-pea were noticed on the left shoulder, attended with decided itching but not with pain. The latter symptom did not come on until three years later. In the course of a year or two the lesions increased in number, so that in four years the shoulder and arm were thickly studded with them. During the next five years no particular changes occurred either in lesions or in the degree of pain. The region affected simply looked like a solid sheet of variously-sized, closely-packed, confluent tubercles, hard and dense. The tubercles were at all times painful to the touch, and even the contact of air was sufficient to cause great suffering. During the paroxysms, which occurred usually at several short intervals every day, the skin changed color frequently and rapidly, passing through various reddish and violet tints, at times becoming purplish.

As a paroxysm came on the man was in the habit of gently pressing and holding the arm closely to his body. At one time he endured the attack in a standing posture, walking the floor, but usually he seated himself very near a hot stove, in a doubled-up, cramped position, utterly unmindful of all surroundings, until the worst pain had ceased. Frequently he was unable to control himself, calling out piteously and vehemently and beseeching that his life be terminated by any means. In desperation he often lay and writhed on the floor in agony. The intense suffering lasted, as a rule, for about a half hour, but he was never without pain of the neuralgic type. He was freer of pain in summer than in winter. Exsection of the brachial plexus was performed, but gave only temporary relief. The man died in his eighty-fourth year of senile debility.

According to Osler the tubercula dolorosa or true fascicular neuroma is not always made up of nerve-fibers, but, as shown by Hoggan, may be an adenomatous growth of the sweat-glands.

Yaws may be defined as an endemic, specific, and contagious disease, characterized by raspberry-like nodules with or without constitutional disturbance. Its synonym, **frambesia,** is from the French, *framboise,* a raspberry. Yaws is derived from a Carib word, the meaning of which is doubtful. It is a disease confined chiefly to tropical climates, and is found on the west coast of Africa for about ten degrees on each side of the equator, and also on the east coast in the central regions, but rarely in the north. It is also found in Madagascar, Mozambique, Ceylon, Hindoostan, and nearly all the tropical islands of the world. Crocker believes it probable that the

[a] 124, Oct., 1881.

button-scurvy of Ireland, now extinct, but described by various writers of 1823 to 1857 as a contagious disease which was prevalent in the south and in the interior of the island, was closely allied to yaws, if not identical with it. The first mention of the yaws disease is by Oviedo, in 1535, who met with it in San Domingo. Although Sauvages at the end of the last century was the first to give an accurate description of this disease, many physicians had observed it before.

Frambesia or yaws was observed in Brazil as early as 1643,[a] and in America later by Lebat in 1722. In the last century Winterbottom and Hume describe yaws in Africa, Hume calling it the African distemper. In 1769 in an essay on the "Natural History of Guiana," Bancroft mentions yaws; and Thomson[b] speaks of it in Jamaica. Hillary in 1759 describes yaws in Barbadoes; and Bajou in Domingo and Cayenne in 1777, Dazille having already observed it in San Domingo in 1742.[c]

Crocker takes his account of yaws from Numa Rat of the Leeward Islands, who divides the case into four stages: incubation, primary, secondary, and tertiary. The incubation stage is taken from the date of infection to the first appearance of the local lesion at the sight of inoculation. It varies from three to ten weeks. The symptoms are vague, possibly palpitation, vertigo, edema of the limbs and eyelids. The primary stage begins with the initial lesion, which consists of a papule which may be found most anywhere on the body. This papule ulcerates. The secondary stage commences about a fortnight after the papule has healed. There is intermittent fever, headache, backache, and shooting pains in the limbs and intercostal spaces, like those of dengue, with nocturnal exacerbations. An eruption of minute red spots appears first on the face, and gradually extends so that the whole body is covered at the end of three days. By the seventh day the apex of the papule is of a pale yellow color, and the black skin has the appearance of being dotted over with yellow wax. The papule then develops into nodules of cylindric shape, with a dome-shaped, thick, yellow crust. It is only with the crust off that there is any resemblance to a raspberry. During the month following the raspberry appearance the skin is covered with scabs which, falling off, leave a pale macula; in dark races the macula becomes darker than normal, but in pale races it becomes paler than the natural skin, and in neither case is it scarcely ever obliterated. Intense itching is almost always present, and anemia is also a constant symptom. The disease is essentially contagious and occurs at all ages and among all sexes, to a lesser degree in whites and hybrids, and is never congenital. It seems to have a tendency to undergo spontaneous recovery.

Furunculus orientalis, or its synonyms, Oriental boil, Aleppo boil, Delhi boil, Biskra button, etc., is a local disease occurring chiefly on the face

[a] De medicina Brasilium, 1643.

[b] 318, xv., 321.

[c] Obs. sur les maladies des negres, Paris, 1742.

and other uncovered spots, endemic in limited districts in hot climates, characterized by the formation of a papule, a nodule, and a scab, and beneath the last a sharply punched-out ulcer. Its different names indicate the districts in which it is common, nearly always in tropical or subtropical climates. It differs from yaws in the absence of febrile symptoms, in its unity, its occurrence often on the feet and the backs of the hands, its duration, and the deep scar which it leaves. A fatal issue is rare, but disfiguring and disabling cicatrices may be left unless great care is employed.

Pigmentary Processes.—Friction, pressure, or scratching, if long continued, may produce extensive and permanent pigmentation. This is seen in its highest degree in itching diseases like prurigo and pityriasis. Greenhow[a] has published instances of this kind under the name of "**vagabond's disease,**" a disease simulating morbus addisonii, and particularly found in tramps and vagrants. In aged people this condition is the pityriasis nigra of Willan. According to Crocker in two cases reported by Thibierge, the oral mucous membrane was also stained. Carrington and Crocker both record cases of permanent pigmentation following exposure to great cold.[b] Gautier is accredited with recording in 1890 the case of a boy of six in whom pigmented patches from sepia to almost black began to form at the age of two, and were distributed all over the body. Precocious maturity of the genital organs preceded and accompanied the pigmentation, but the hair was illy developed.

Chloasma uterinum presents some interesting anomalies. Swayne records a singular variety in a woman in whom, during the last three months of three successive pregnancies, the face, arms, hands, and legs were spotted like a leopard, and remained so until after her confinement. Crocker speaks of a lady of thirty whose skin during each pregnancy became at first bronze, as if it had been exposed to a tropical sun, and then in spots almost black. Kaposi knew a woman with a pigmented mole two inches square on the side of the neck, which became quite black at each pregnancy, and which was the first recognizable sign of her condition. It is quite possible that the black disease of the Garo Hills in Assam[c] is due to extreme and acute development of a pernicious form of malaria. In chronic malaria the skin may be yellowish, from a chestnut-brown to a black color, after long exposure to the influence of the fever. Various fungi, such as tinea versicolor and the Mexican "Caraati," may produce discoloration on the skin.

Acanthosis Nigricans may be defined as a general pigmentation with papillary mole-like growths. In the "International Atlas of Rare Skin Diseases" there are two cases pictured, one by Politzer in a woman of sixty-two, and the other by Janovsky in a man of forty-two. The regions affected were mostly of a dirty-brown color, but in patches of a bluish-gray. The disease began suddenly in the woman, but gradually in the man. Crocker has

[a] 767, ix. [b] 767, xiv. [c] 224, Nov. 29, 1884.

reported a case somewhat similar to these two, under the head of general bronzing without constitutional symptoms, in a Swedish sailor of twenty-two, with rapid onset of pigmentation.[a]

Xeroderma pigmentosum, first described by Kaposi in 1870, is a very rare disease, but owing to its striking peculiarities is easily recognized. Crocker saw the first three cases in England, and describes one as a type. The patient was a girl of twelve, whose general health and nutrition were good. The disease began when she was between twelve and eighteen months old, without any premonitory symptom. The disease occupied the parts habitually uncovered in childhood. The whole of these areas was more or less densely speckled with pigmented, freckle-like spots, varying in tint from a light, raw umber to a deep sepia, and in size from a pin's head to a bean, and of a roundish and irregular shape. Interspersed among the pigment-spots, but not so numerous, were white atrophic spots, which in some parts coalesced, forming white, shining, cicatrix-like areas. The skin upon this was finely wrinkled, and either smooth or shiny, or covered with thin, white scales. On these white areas bright red spots were conspicuous, due to telangiectasis, and there were also some stellate vascular spots and striæ interspersed among the pigment. Small warts were seen springing up from some of the pigment-spots. These warts ulcerated and gave rise to numerous superficial ulcerations, covered with yellow crusts, irregularly scattered over the face, mostly on the right side. The pus coming from these ulcers was apparently inocuous. The patient complained neither of itching nor of pain. Archambault[b] has collected 60 cases, and gives a good resume to date. Amiscis reports two cases of brothers, in one of whom the disease began at eight months, and in the other at a year, and concludes that it is not a lesion due to external stimuli or known parasitic elements, but must be regarded as a specific, congenital dystrophy of the skin, of unknown pathogenesis. However, observations have shown that it may occur at forty-three years (Riehl), and sixty-four years (Kaposi). Crocker believes that the disease is an atrophic degeneration of the skin, dependent on a primary neurosis, to which there is a congenital predisposition.

Nigrities is a name given by the older writers to certain black blotches occurring on the skin of a white person—in other words, it is a synonym of melasma. According to Rayer it is not uncommon to see the scrotum and the skin of the penis of adults almost black, so as to form a marked contrast with the pubes and the upper part of the thighs. Haller[c] met with a woman in whom the skin of the pubic region was as black as that of a negress. During nursing the nipples assume a deep black color which disappears after weaning. Le Cat speaks of a woman of thirty years, whose forehead assumed a dusky hue of the color of iron rust when she was pregnant about the seventh month. By degrees the whole face became black except the eyes and the edges of the

[a] 767, xiv., 152. [b] "Thèse de Bordeaux," 1890. [c] 400, v., 18.

lips, which retained their natural color. On some days this hue was deeper than on others; the woman being naturally of a very fair complexion had the appearance of an alabaster figure with a black marble head. Her hair, which was naturally exceedingly dark, appeared coarser and blacker. She did not suffer from headache, and her appetite was good. After becoming black, the face was very tender to the touch. The black color disappeared two days after her accouchement, and following a profuse perspiration by which the sheets were stained black. Her child was of a natural color. In the following pregnancy, and even in the third, the same phenomenon reappeared in the course of the seventh month; in the eighth month it disappeared, but in the ninth month this woman became the subject of convulsions, of which she had one each day. The existence of accidental nigrities rests on well-established facts which are distinctly different from the pigmentation of purpura, icterus, or that produced by metallic salts. Chomel [a] quotes the case of a very apathic old soldier, whose skin, without any appreciable cause, became as brown as that of a negro in some parts, and a yellowish-brown in others. Rustin [b] has published the case of a woman of seventy who became as black as a negress in a single night. Goodwin [302] relates the case of an old maiden lady whose complexion up to the age of twenty-one was of ordinary whiteness, but then became as black as that of an African. Wells and Rayer have also published accounts of cases of accidental nigrities. One of the latter cases was a sailor of sixty-three who suffered from general nigrities, and the other was in a woman of thirty, appearing after weaning and amenorrhea.

Mitchell Bruce has described an **anomalous discoloration of the skin and mucous membranes** resembling that produced by silver or cyanosis. The patient, a harness-maker of forty-seven, was affected generally over the body, but particularly in the face, hands, and feet. The conjunctival, nasal, and aural mucosa were all involved. The skin felt warm, and pressure did not influence the discoloration. The pains complained of were of an intermittent, burning, shooting character, chiefly in the epigastric and left lumbar regions. The general health was good, and motion and sensation were normal. Nothing abnormal was discovered in connection with the abdominal and thoracic examinations. The pains and discoloration had commenced two years before his admission, since which time the skin had been deepening in tint. He remained under observation for three months without obvious change in his symptoms. There was nothing in the patient's occupation to account for the discoloration. A year and a half previously he had taken medicine for his pains, but its nature could not be discovered. He had had syphilis.

Galtier mentions congenital and bronze spots of the skin. A man born in Switzerland the latter part of the last century, calling himself Joseph Galart, attracted the attention of the curious by exhibiting himself under the

[a] Bull. de la Fac. de Méd. de Paris, 1814, No. 6. [b] Ibid., 1817, Nos. 9 and 10.

name of the "**Living Angel.**" He presented the following appearance: The skin of the whole posterior part of the trunk, from the nape of the neck to the loins, was of a bronze color. This color extended over the shoulders and the sides of the neck, and this part was covered with hairs of great fineness and growing very thick; the skin of the rest of the body was of the usual whiteness. Those parts were the darkest which were the most covered with hair; on the back there was a space of an inch in diameter, which had preserved its whiteness, and where the hairs were fewer in number, darker at their bases, and surrounded by a very small black circle; the hair was thinner at the sides of the neck; there were a great many individual hairs surrounded by circles of coloring matter; but there were also many which presented nothing of this colored areola. In some places the general dark color of the skin blended with the areola surrounding the roots of the hair, so that one uniform black surface resulted. In many places the dark color changed into black. The irides were brown. The man was of very unstable character, extremely undecided in all his undertakings, and had a lively but silly expression of countenance. A distinct smell, as of mice, with a mixture of a garlicky odor, was emitted from those parts where the excessive secretion of the coloring matter took place. In those places the heat was also greater than natural. Rayer recites the case of a young man whom he saw, whose eyelids and adjacent parts of the cheeks were of a bluish tint, similar to that which is produced on the skin by the explosion of gunpowder.

Billard[a] has published an extraordinary case of **blue discoloration of the skin** in a young laundress of sixteen. Her neck, face, and upper part of the chest showed a beautiful blue tint, principally spreading over the forehead, the alæ, and the mouth. When these parts were rubbed with a white towel the blue parts of the skin were detached on the towel, coloring it, and leaving the skin white. The girl's lips were red, the pulse was regular and natural, and her strength and appetite like that of a person in health. The only morbid symptom was a dry cough, but without mucous rattle or any deficiency of the sound of the chest or alteration of the natural beat of the heart. The catamenia had never failed. She had been engaged as a laundress for the past two years. From the time she began this occupation she perceived a blueness around her eyes, which disappeared however on going into the air. The phenomenon reappeared more particularly when irons were heated by a bright charcoal fire, or when she worked in a hot and confined place. The blueness spread, and her breast and abdomen became shaded with an azure blue, which appeared deeper or paler as the circulation was accelerated or retarded. When the patient's face should have blushed, the face became blue instead of red. The changes exhibited were like the sudden transition of shades presented by the chameleon. The posterior part of the trunk, the axillæ, the sclerotic coats of the eyes, the nails, and the skin of the head remained in

[a] 162, T. xxvi., 453.

their natural state and preserved their natural color. The linen of the patient was stained blue. Chemical analysis seemed to throw no light on this case, and the patient improved on alkaline treatment. She vomited blood, which contained sufficient of the blue matter to stain the sides of the vessel. She also stated that in hemorrhage from the nose she had seen blue drops among the drops of blood. One cannot but suspect indigo as a factor in the causation of this anomalous coloration.

Artificial discolorations of the skin are generally produced by tattooing, by silver nitrate, mercury, bismuth, or some other metallic salt.

Melasma has been designated as an accidental and temporary blackish discoloration of the skin. There are several varieties: that called Addison's disease, that due to uterine disease, etc. In this affection the skin assumes a dark and even black hue.

Leukoderma is a pathologic process, the result of which is a deficiency in the normal pigmentation of the skin, and possibly its appendages. Its synonyms are leukopathia, vitiligo, achroma, leukasmus, and chloasma album. In India the disease is called sufaid-korh, meaning white leprosy. It has numerous colloquial appellations, such as chumba or phoolyree (Hindoo), buras (Urdu), cabbore (Singalese), kuttam (Taneil), dhabul (Bengal). It differs from albinism in being an acquired deficiency of pigment, not universal and not affecting the eye. Albinism is congenital, and the hair and eyes are affected as well as the skin.

The disease is of universal distribution, but is naturally more noticeable in the dark-skinned races. It is much more common in this country among the negroes than is generally supposed.

The "leopard-boy of Africa," so extensively advertised by dime museums over the country, was a well-defined case of leukoderma in a young mulatto, a fitting parallel for the case of ichthyosis styled the "alligator-boy."

Figure 293 represents a family of three children, all the subjects of leukoderma. Leukoderma is more common among females. It is rarely seen in children, being particularly a disease of middle age. Bissell reports a case in an Indian ninety years of age, subsequent to an attack of rheumatism thirty years previous. It is of varying duration, nearly every case giving a different length of time. It may be associated with most any disease, and is directly attributable to none. In a number of cases collected rheumatism has been a marked feature. It has been noticed following typhoid fever and pregnancy.

In white persons there are spots or blotches of pale, lustreless appearance, either irregular or symmetric, scattered over the body. In the negro and other dark-skinned races a mottled appearance is seen. If the process goes to completion, the whole surface changes to white. The hair, though rarely affected, may present a mottled appearance. There seems to be no constitutional disturbances, no radical change in the skin, no pain—in fact, no dis-

turbance worthy of note. The eye is not affected; but in a negro the sclerotic generally appears muddy.

It appears first in small spots, either on the lips, nose, eyelids, soles, palms, or forehead, and increases peripherally—the several spots fusing together. The skin is peculiarly thin and easily irritated. Exposure to the sun readily blisters it, and after the slightest abrasion it bleeds freely. Several cases have been reported in which the specific gravity of the urine was extremely high, due to an excess of urea. Wood calls attention to the wave-

Fig. 293.—"The leopard family."

like course of leukoderma, receding on one side, increasing on the other. The fading is gradual, and the margins may be abrupt or diffuse. The mucous membranes are rosy. The functions of the sweat-glands are unimpaired.

The theory of the absence of pigment causing a loss of the olfactory sense, spoken of by Wallace, is not borne out by several observations of Wood and others. Wilson says: "Leukasma is a neurosis, the result of weakened innervation of the skin, the cause being commonly referable to the organs of [illegible] reproduction." It is not a dermatitis, as a dermatitis usually

causes deposition of pigment. The rays of the sun bronze the skin; mustard, cantharides, and many like irritants cause a dermatitis, which is accompanied by a deposition of pigment. Leukoderma is as common in housemaids as in field-laborers, and is in no way attributable to exposure of sun or wind. True leukodermic patches show no vascular changes, no infiltration, but a partial obliteration of the rete mucosum. It has been ascribed to syphilis; but syphilitic leukoderma is generally the result of cicatrices following syphilitic ulceration.

Many observers have noticed that negroes become several degrees lighter after syphilization; but no definite relation between syphilis and leukoderma has yet been demonstrated in this race. Postmortem examinations of leukodermic persons show no change in the suprarenal capsule, a supposed organ of pigmentation.

Climate has no influence. It is seen in the Indians of the Isthmus of Darien, the Hottentots, and the Icelanders. Why the cells of the rete mucosum should have the function in some races of manufacturing or attracting pigment in excess of those of other races, is in itself a mystery. By his experiments on the pigment-cells of a frog Lister has established the relation existing between these elements and innervation, which formerly had been supposititious.

Doubtless a solution of the central control of pigmentation would confirm the best theory of the cause of leukoderma—*i. e.*, faulty innervation of the skin. At present, whether the fault is in the cell proper, the conducting media, or the central center, we are unable to say. It is certainly not due to any vascular disturbances, as the skin shows no vascular changes.

White spots on the nails are quite common, especially on young people. The mechanic cause is the presence of air between the lamellæ of the affected parts, but their origin is unknown. According to Crocker in some cases they can be shown to be a part of trophic changes. Bielschowsky[a] records the case of a man with peripheral neuritis, in whom white spots appeared at the lower part of the finger-nails, grew rapidly, and in three weeks coalesced into a band across each nail a millimeter wide. The toes were not affected. Shoemaker mentions a patient who suffered from relapsing fever and bore an additional band for each relapse. Crocker quotes a case reported by Morison of Baltimore, in which transverse bars of white, alternating with the normal color, appeared without ascertainable cause on the finger-nails of a young lady and remained unchanged.

Giovannini describes a case of **canities unguium** in a patient of twenty-nine, following an attack of typhoid fever. On examining the hands of this patient the nails showed in their entire extent a white, opaque, almost ivory color. An abnormal quantity of air found in the interior of the nails explains in this particular case their impaired appearance. It is certain that the nails,

[a] 224, Jan. 17, 1891.

in order to have admitted such a large quantity of air into their interior must have altered in their intimate structure; and Giovannini suggests that they were subject to an abnormal process of keratinization. Unna describes a similar case, which, however, he calls leukonychia.

Plica polonica, or, as it was known in Cracow—*weichselzopf*, is a disease peculiar to Poland, or to those of Polish antecedents, characterized by the agglutination, tangling, and anomalous development of the hair, or by an alteration of the nails, which become spongy and blackish. In older days the disease was well known and occupied a prominent place in books on skin-diseases. Hercules de Saxonia and Thomas Minadous, in 1610, speak of plica as a disease already long known. The greater number of writers fix the date of its appearance in Poland at about the year 1285, under the reign of Lezek-le-Noir. Lafontaine[a] stated that in the provinces of Cracow and Sandomir plica formerly attacked the peasantry, beggars, and Jews in the proportion of 1½ in 20; and the nobility and burghers in the proportion of two in 30 or 40. In Warsaw and surrounding districts the disease attacked the first classes in the proportion of one to ten, and in the second classes one to 30. In Lithuania the same proportions were observed as in Warsaw; but the disease has gradually grown rarer and rarer to the present day, although occasional cases are seen even in the United States.

Plica has always been more frequent on the banks of the Vistula and Borysthenes, in damp and marshy situations, than in other parts of Poland. The custom formerly prevailing in Poland of shaving the heads of children, neglect of cleanliness, the heat of the head-dress, and the exposure of the skin to cold seem to favor the production of this disease.

Plica began after an attack of acute fever, with pains like those of acute rheumatism in the head and extremities, and possibly vertigo, tinnitus aurium, ophthalmia, or coryza. Sometimes a kind of redness was observed on the thighs, and there was an alteration of the nails, which became black and rough; and again, there was clammy sweat. When the scalp was affected the head was sore to the touch and excessively itchy. A clammy and agglutinating sweat then occurred over the cranium, the hair became unctuous, stuck together, and appeared distended with an adhesive matter of reddish-brown color, believed by many observers to be sanguineous. The hair was so acutely sensitive that the slightest touch occasioned severe pain at the roots. A viscid matter of a very offensive smell, like that of spoiled vinegar, or according to Rayer like that of mice or garlic, exuded from the whole surface of each affected hair. This matter glued the hairs together, at first from their exit at the skin, and then along the entire length; it appeared to be secreted from the whole surface of the scalp and afterward dried into an incrustation. If there was no exudation the disease was called plica sicca. The hair was matted and stuck together in a variety of ways, so as to resemble ropes (plica mul-

[a] Traité de la Plique Polonaise, etc., Paris, 1808.

tiformis). Sometimes these masses united together and formed one single thick club like the tail of a horse (plica caudiformis). Again, and particularly in females, the hair would become matted and glued together into one uniform intricate mass of various magnitudes. The hair of the whole body was likely to be attacked with this disease. Kalschmidt of Jena possessed the pubes of a woman dead of plica, the hair of which was of such length that it must have easily gone around the body. There was formerly a superstition that it was dangerous to cut the hair until the discharge diminished. Lafontaine, Schlegel, and Hartman all assure us that the section of the affected masses before this time has been known to be followed by amaurosis, convulsions, apoplexy, epilepsy, and even death. Alarmed or taught by such occurrences, the common people often went about all their lives with the plica gradually dropping off. Formerly there was much theorizing and discussion regarding the etiology and pathology of plica, but since this mysterious affection has been proved to be nothing more than the product of neglect, and the matting due to the inflammatory exudation, excited by innumerable pediculi, agglutinating the hair together, the term is now scarcely mentioned in dermatologic works. Crocker speaks of a rare form which he entitles neuropathic plica, and cites two cases, one reported by Le Page [a] whose specimen is in the Royal College of Surgeons Museum; and the other was in a Hindoo described by Pestonji.[b] Both occurred in young women, and in both it came on after washing the hair in warm water, one in a few minutes, and the other in a few hours. The hair was drawn up into a hard tangled lump, impossible to unravel, limited to the right side in Le Page's patient, who had very long hair, and in Pestonji's case to the back of the head, where on each side was an elongated mass, very hard and firm, like a rope and about the size of the fist. There was no reason to believe that it was ascribable to imposture; the Hindoo woman cut the lumps off herself and threw them away. Le Page found the most contracted hairs flattened. Stellwagon [c] reports a case of plica in a woman. It occupied a dollar-sized area above the nape of the neck, and in twelve years reached the length of 12 feet. There was no history of its manner of onset.

Tinea nodosa is a name given by Morris and Cheadle to a case of nodular growth on the beard and whiskers of a young man. In a case noticed by Crocker this disease affected the left side of the mustache of a medical man, who complained that the hair, if twisted up, stuck together. When disintegrated the secretion in this case seemed to be composed of fungous spores. Epithelium fragments, probably portions of the internal root-sheath, sometimes adhere to the shaft of the hair as it grows up, and look like concretions. Crocker states that he is informed by White of Boston that this disease is common in America in association with alopecia furfuracea, and is erroneously thought to be the cause of the loss of hair, hence the popular name, "**hair-eaters.**"

 [a] 224, Jan. 26, 1884. [b] 476, Sept. 3, 1885. [c] 124, Dec., 1892.

Thomson describes a case of **mycosis fungoides** [a] in a young girl of the age of fourteen, whom he saw in Brussels toward the end of October, 1893. She was the third of a family of 13 children of whom only five survived. Of the children born subsequently to the patient, the first were either premature or died a few days after their births. The seventh was under treatment for interstitial keratitis and tuberculous ulceration of the lips and throat. The disease in the patient made its appearance about seven months previously, as a small raised spot in the middle of the back just above the buttocks. Many of the patches coalesced. At the time of report the lumbar region was the seat of the disease, the affection here presenting a most peculiar appearance, looking as if an enormous butterfly had alighted on the patient's back, with its dark blue wings covered with silvery scales, widely expanded. The patient was not anemic and appeared to be in the best of health. None of the glands were affected. According to Thomson there is little doubt that this disease is caused by non-pyogenic bacteria gaining access to the sweat-glands. The irritation produced by their presence gives rise to proliferation of the connective-tissue corpuscles.

Fig. 294.—Mycosis fungoides (Jamieson, Edin. Med. Jour., March, 1893).

Jamieson reports a case of mycosis in a native of Aberdeenshire aged thirty-eight. There was no history of any previous illness. The disease began three years previous to his application for treatment, as a red, itching, small spot on the cheek. Two years later lumps presented themselves, at first upon his shoulders. The first thing to strike an observer was the offensive odor about the patient. In the hospital wards it made all the occupants sick. The various stages of the disease were marked upon the different parts of the body. On the chest and abdomen it resembled an eczema; on the shoulders there were brown, pinkish-red areas. On the scalp the hair was scanty, the eye-brows denuded, and the eyelashes absent. The forehead was leonine in aspect. From between the various nodosities a continual discharge exuded, the nodosities being markedly irregular over the limbs. The backs of the hands, the dorsums of the feet, the wrists and ankles, had closely approximating growths upon them, while under the thick epidermis of the palms of the hands were blisters. Itching was intense. The patient became emaciated and died thirteen days after his admission into the hospital. A histologic examination showed the sarcomatous nature of the various growths. The disease differed

[a] "Internat. Atlas Rare Skin Diseases."

from "button-scurvy." Mycosis fungoides approximates, clinically and histologically, granulomata and sarcomata.

Morris[a] described an interesting case of **universal dermatitis,** probably a rare variety of mycosis fungoides (Plate 12). The patient had for many years a disease which had first appeared on the arms and legs, and which was usually regarded by the physicians who saw the case as eczema. At times the disease would entirely disappear, but it relapsed, especially during visits to India. At the time the patient came under the care of Morris, his general health seemed unaffected. The skin of the whole body, except the face, the scalp, and the front of the chest, was of a mahogany color. The skin of the lips was so thickened that it could not be pinched into folds, and was of a mottled appearance, due to hemorrhagic spots. All over the thickened and reddened surface were scattered crops of vesicles and boils. The nails were deformed, and the toes beyond the nails were tense with a serous accumulation. The glands in the right axilla and the groin were much enlarged. The hair on the pubes had disappeared. The abdomen was in a condition similar to that upon the limbs, but less in degree. The front of the chest below the nipples was covered with dark papules the size of a pin's head. The back, the buttocks, the face, and the scalp presented similar lesions. The most striking lesions were three ulcers—one on the back of the right hand, one on the right temple, and the other on the left cheek. The largest was the size of a florin, and had elevated borders, somewhat infiltrated; they were covered with a brown, dry scab. The patient suffered from itching at night so that he could not sleep. He was kept under observation, and in spite of treatment the malady advanced in a periodic manner, each exacerbation being preceded by a feeling of tension in the parts, after which a crop of vesicles would appear. Sometimes, especially on the feet, bullæ formed. The patient finally left the hospital and died of an intercurrent attack of pneumonia. A microscopic examination revealed a condition which might be found with a number of the chronic affections of the skin, but, in addition, there were certain cell-inclusions which were thought to represent psorosperms. Morris thought this case corresponded more to mycosis fungoides than any other malady.

[a] 224, June 2, 1894.

CHAPTER XVII.

ANOMALOUS NERVOUS AND MENTAL DISEASES.

Epilepsy has been professionally recognized as a distinct type of disease since the time of Hippocrates, but in earlier times, and popularly throughout later times, it was illy defined. The knowledge of the clinical symptoms has become definite only since the era of cerebral local anatomy and localization. Examination of the older records of epilepsy shows curious forms recorded. The Ephemerides speaks of epilepsy manifested only on the birthday. Testa [758] mentions epilepsy recurring at the festival of St. John, and Bartholinus [190] reports a case in which the convulsions corresponded with the moon's phases. Paullini [620] describes epilepsy which occurred during the blowing of wind from the south, and also speaks of epilepsy during the paroxysms of which the individual barked. Fabricius [332] and the Ephemerides record dancing epilepsy. Bartholinus and Hagendorn mention cases during which various splendors appeared before the eyes during the paroxysm. Godart [a] Portius, and Salmuth [706] speak of visions occurring before and after epileptic paroxysms. The Ephemerides contains records of epilepsy in which blindness preceded the paroxysm, in which there was singing during it, and a case in which the paroxysm was attended with singultus. Various older writers mention cases of epilepsy in which curious spots appeared on the face; and the kinds of aura mentioned are too numerous to transcribe.

Baly [b] mentions a case of epilepsy occasioned by irritation in the socket of a tooth. Webber [c] reports a case of epilepsy due to phimosis and to irritation from a tooth. Beardsley [d] speaks of an attempt at strangulation that produced epilepsy. Brown-Séquard [e] records an instance produced by injury to the sciatic nerve. Doyle [f] gives an account of the production of epilepsy from protracted bathing in a pond. Duncan [g] cites an instance of epilepsy connected with vesical calculus that was cured by lithotomy. Muscroft mentions an analogous case. Greenhow [h] speaks of epilepsy arising from an injury to the thumb. Garmannus, early in the eighteenth century, describes epilepsy arising from fright and terror. Bristowe in 1880, and Farre [i] speak of similar instances. In Farre's case the disease was temporarily cured by

[a] 462, xiii., 393. [b] 490, xlviii., 534. [c] 218, c., 513. [d] 476, 1856, i., 454.
[e] 538, 1872, 472. [f] West. Med. and Phar. Jour., Cincin., 1828-29, ii., 454.
[g] 318, 1868-69, xiv., 140. [h] 548, 1863, i., 538. [i] 476, 1861, i., 628.

an attack of acute rheumatism. Thorington of Philadelphia has seen a paroxysm of epilepsy induced by the instillation of atropia in the eye of a child nearly cured of the malady. It was supposed that the child was terrified on awakening and finding its vision suddenly diminished, and that the convulsions were directly due to the emotional disturbance. Orwin describes epilepsy from prolonged lactation, and instances of ovarian and uterine epilepsy are quite common.

There is a peculiar case of running epilepsy recorded.[a] The patient was a workman who would be suddenly seized with a paroxysm, and unconsciously run some distance at full speed. On one occasion he ran from Peterborough to Whittlesey, where he was stopped and brought back. Once he ran into a pit containing six feet of water, from which he was rescued. Yeo[b] says that sexual intercourse occasionally induces epilepsy, and relates a case in which a severe epileptic fit terminated fatally three days after the seizure, which occurred on the nuptial night.

Drake[c] reports the case of a man who was wounded in the War of 1812, near Baltimore, the ball passing along the left ear and temple so close as to graze the skin. Eighteen years after the accident he suffered with pain in the left ear and temple, accompanied by epileptic fits and partial amnesia, together with an entire loss of power of remembering proper names and applying them to the objects to which they belonged. He would, for instance, invariably write Kentucky for Louisville. Beirne[d] records the case of a dangerous lunatic, an epileptic, who was attacked by a fellow-inmate and sustained an extensive fracture of the right parietal bone, with great hemorrhage, followed by coma. Strange to say, after the accident he recovered his intellect, and was cured of his epileptic attacks, but for six years he was a paralytic from the hips down.

The Dancing Mania.—Chorea has appeared in various epidemic forms under the names of St. Vitus's dance, St. Guy's dance, St. Anthony's dance, choromania, tanzplage, orchestromania, dance of St. Modesti or St. John, the dancing mania, etc.; although these various functional phenomena of the nervous system have been called chorea, they bear very little resemblance to what, at the present day, is called by this name. The epidemic form appeared about 1374, although Hecker[406] claims that, at that time, it was no new thing. Assemblages of men and women were seen at Aix-la-Chapelle who, impelled by a common delusion, would form circles, hand in hand, and dance in wild delirium until they fell to the ground exhausted, somewhat after the manner of the Ghost-Dance or Messiah-Dance of our North American Indians. In their Bacchantic leaps they were apparently haunted by visions and hallucinations, the fancy conjuring up spirits whose names they shrieked out. Some of them afterward stated that they appeared to be immersed in a stream of blood which obliged them to leap so high. Others saw the

[a] 224, 1879, ii., 78. [b] 476, 1878, i., 89. [c] 816, 1835. [d] 312, 1843, x., 146.

heavens open and disclose the Saviour enthroned with the Virgin Mary. The participants seemed to suffer greatly from tympanites which was generally relieved by compression or thumping on the abdomen. A few months after this dancing malady had made its appearance at Aix-la-Chapelle it broke out at Cologne, and about the same time at Metz, the streets of which were said to have been filled with 1100 dancers. This rich city became the scene of the most ruinous disorder. Peasants left their plows, mechanics their shops, servants their masters, children their homes; and beggars and idle vagabonds, who understood how to imitate the convulsions, roved from place to place, inducing all sorts of crime and vice among the afflicted. Strasburg was visited by the dancing plague in 1418, and it was here that the plague assumed the name of St. Vitus's dance. St. Vitus was a Sicilian youth who, just at the time he was about to undergo martyrdom by order of Diocletian, in the year 303, is said to have prayed to God that He might protect all those who would solemnize the day of his commemoration and fast upon its eve. The people were taught that a voice from heaven was then heard saying, "Vitus, thy prayer is accepted."

Paracelsus called this malady (Chorus sancti viti) the lascivious dance, and says that persons stricken with it were helpless until relieved by either recovery or death. The malady spread rapidly through France and Holland, and before the close of the century was introduced into England. In his "Anatomy of Melancholy" Burton refers to it, and speaks of the idiosyncrasies of the individuals afflicted. It is said they could not abide one in red clothes, and that they loved music above all things, and also that the magistrates in Germany hired musicians to give them music, and provided them with sturdy companions to dance with. Their endurance was marvelous. Plater speaks of a woman in Basle whom he saw, that danced for a month. In Strasburg many of them ate nothing for days and nights until their mania subsided. Paracelsus, in the beginning of the sixteenth century, was the first to make a study of this disease. He outlined the severest treatment for it, and boasted that he cured many of the victims. Hecker conjectures that probably the wild revels of St. John's day, 1374, gave rise to this mental plague, which thenceforth visited so many thousands with incurable aberrations of mind and disgusting distortions of the body. Almost simultaneous with the dance of "St. With," there appeared in Italy and Arabia a mania very similar in character which was called "**tarantism**," which was supposed to originate in the bite of the tarantula. The only effective remedy was music in some form. In the Tigrè country, Abyssinia, this disease appeared under the name of "Tigretier." The disease, fortunately, rapidly declined, and very little of it seems to have been known in the sixteenth century, but in the early part of the eighteenth century a peculiar sect called the "Convulsionnaires" arose in France; and throughout England among the Methodist sect, insane convulsions of this nature were witnessed; and even to the present

day in some of the primitive religious meetings of our people, something not unlike this mania of the Middle Ages is perpetuated.

Paracelsus divided the sufferers of St. Vitus's dance into three classes :—

(1) Those in which the affliction arose from imagination (chorea imaginativa).

(2) Those which had their origin in sexual desires depending on the will.

(3) Those arising from corporeal causes (chorea naturalis). This last case, according to a strange notion of his own he explained by maintaining that in certain vessels which are susceptible of an internal pruriency, and thence produced laughter, the blood is set into commotion in consequence of an alteration in the vital spirits, whereby are occasioned involuntary fits of intoxicating joy, and a propensity to dance. The great physician Sydenham gave the first accurate description of what is to-day called chorea, and hence the disease has been named "Sydenham's chorea." So true to life was his portrayal of the disease that it has never been surpassed by modern observers.

The disease variously named **palmus, the jumpers, the twitchers, lata, miryachit,** or, as it is sometimes called, the **emeryaki** of Siberia, and the tic-convulsif of La Tourette, has been very well described by Gray [a] who says that the French authors had their attention directed to the subject by the descriptions of two American authors—those of Beard upon "The Jumpers of Maine," published in 1880, and that of Hammond upon "Miryachit," a similar disease of the far Orient. Beard found that the jumpers of Maine did unhesitatingly whatever they were told to do. Thus, one who was sitting in a chair was told to throw a knife that he had in his hand, and he obeyed so quickly that the weapon stuck in a house opposite ; at the same time he repeated the command given him, with a cry of alarm not unlike that of hysteria or epilepsy. When he was suddenly clapped upon the shoulder he threw away his pipe, which he had been filling with tobacco. The first parts of Virgil's Æneid and Homer's Iliad were recited to one of these illiterate jumpers, and he repeated the words as they came to him in a sharp voice, at the same time jumping or throwing whatever he had in his hand, or raising his shoulder, or making some other violent motion. It is related by O'Brien, an Irishman serving on an English naval vessel, that an elderly and respectable Malay woman, with whom he was conversing in an entirely unsuspecting manner, suddenly began to undress herself, and showed a most ominous and determined intention of stripping herself completely, and all because a by-standing friend had suddenly taken off his coat ; at the same time she manifested the most violent anger at what she deemed this outrage to her sex, calling the astonished friend an abandoned hog, and begging O'Brien to kill him. O'Brien, furthermore, tells of a cook who was carrying his child in his arms over the bridge of a river, while at the same time a sailor carried a log of wood in like manner ; the sailor threw his log

[a] 124, May, 1894, 195.

of wood on an awning, amusing himself by causing it to roll over the cloth, and finally letting it fall to the bridge; the cook repeated every motion with his little boy, and killed him on the spot. This miryachit was observed in Malaysia, Bengal, among the Sikhs and the Nubians, and in Siberia, whilst Beard has observed it in Michigan as well as in Maine. Crichton [a] speaks of a leaping ague in Angusshire, Scotland.

Gray has seen only one case of acute palmus, and records it as follows: "It was in a boy of six, whose heredity, so far as I could ascertain from the statements of his mother, was not neurotic. He had had trouble some six months before coming to me. He had been labeled with a number of interesting diagnoses, such as chorea, epilepsy, myotonia, hysteria, and neurasthenia. His palmodic movements were very curious. When standing near a table looking at something, the chin would suddenly come down with a thump that would leave a black-and-blue mark, or his head would be thrown violently to one side, perhaps coming in contact with some adjacent hard object with equal force, or, while standing quietly, his legs would give a sudden twitch, and he would be thrown violently to the ground, and this even happened several times when he was seated on the edge of a stool. The child was under my care for two weeks, and, probably because of an intercurrent attack of diarrhea, grew steadily worse during that time, in spite of the full doses of arsenic which were administered to him. He was literally covered with bruises from the sudden and violent contacts with articles of furniture, the floor, and the walls. At last, in despair at his condition, I ordered him to be undressed and put to bed, and steadily pushed the Fowler's solution of arsenic until he was taking ten drops three times a day, when, to my great surprise, he began to improve rapidly, and at the end of six weeks was perfectly well. Keeping him under observation for two weeks longer I finally sent him to his home in the West, and am informed that he has since remained perfectly well. It has seemed to me that many of the cases recorded as paramyoclonus multiplex have been really acute palmus."

Gray mentions two cases of general palmus with pseudomelancholia, and describes them in the following words:—

"The muscular movements are of the usual sudden, shock-like type, and of the same extent as in what I have ventured to call the general form. With them, however, there is associated a curious pseudomelancholia, consisting of certain fixed melancholy suspicious delusions, without, however, any of the suicidal tendencies and abnormal sensations up and down the back of the head, neck, or spine, or the sleeplessness, which are characteristic of most cases of true melancholia. In both of my cases the palmus had existed for a long period, the exact limits of which, however, I could not determine, because the patient scouted the idea that he had had any trouble of the kind, but which the testimony of friends and relatives seemed to vouch for. They were

[a] 318, 1829, 299.

both men, one thirty-six and one thirty-eight years of age. The pseudo-melancholia, however, had only existed in one case for about a year, and in the other for six months. One case passed away from my observation, and I know nothing of its further course. The other case recovered in nine months' treatment, and during the three years that have since elapsed he has been an active business man, although I have not seen him myself during that period, as he took a great dislike to me because I was forced to take strong measures to keep him under treatment, so persistent were his suspicions."

Athetosis was first described by Hammond in 1871, who gave it the name because it was mainly characterized by an inability to retain the fingers and toes in any position in which they might be placed, as well as by their continuous motion. According to Drewry[a] "athetosis is a cerebral affection, presenting a combination of symptoms characterized chiefly by a more or less constant mobility of the extremities and an inability to retain them in any fixed position. These morbid, grotesque, involuntary movements are slow and wavy, somewhat regular and rigid, are not jerky, spasmodic, nor tremulous. The movements of the digits are quite different from those attending any other disease, impossible to imitate even by the most skilful malingerer, and, if once seen, are not likely to be forgotten. In an athetoid hand, says Starr, the interossei and lumbricales, which flex the metacarpo-phalangeal and extend the phalangeal joints, are affected; rarely are the long extensors and the long flexors affected. Therefore the hand is usually in the so-called interosseal position, with flexion of the proximal and extension of the middle and distal phalanges. The athetoid movements of the toes correspond to those of the fingers in point of action. In a great majority of cases the disease is confined to one side (hemiathetosis), and is a sequel of hemiplegia. The differential diagnosis of athetosis is generally easily made. The only nervous affections with which it could possibly be confounded are chorea and paralysis agitans. Attention to the twitching, spasmodic, fibrillary movements, having a quick beginning and a quick ending, which is characteristic in Sydenham's chorea, would at once exclude that disease. These jerky movements peculiar to St. Vitus's dance may be easily detected in a few or many muscles, if moderate care and patience be exercised on the part of the examiner. This form of chorea is almost always a disease of childhood. So-called post-hemiplegic chorea is, in the opinion of both Hammond and Gray, simply athetosis. The silly, dancing, posturing, wiry movements, and the facial distortion observed in Huntington's chorea would hardly be mistaken by a careful observer for athetosis. The two diseases, however, are somewhat alike. Paralysis agitans (shaking palsy), with its coarse tremor, peculiar facies, immobility, shuffling gait, the 'bread-crumbling' attitude of the fingers, and deliberate speech, would be readily eliminated even by a novice. It is, too, a disease of advanced

[a] 809, May, 1895.

life, usually. Charcot, Gray, Ringer, Bernhardt, Shaw, Eulenberg, Grasset, Kinnicutt, Sinkler, and others have written on this affection."

The following is the report of a case by Drewry, of double (or, more strictly speaking, quadruple) athetosis, associated with epilepsy and insanity: "The patient was a negro woman, twenty-six years old when she was admitted into this, the Central State (Va.) Hospital, in April, 1886. She had had epilepsy of the *grand mal* type for a number of years, was the mother of one child, and earned her living as a domestic. A careful physical examination revealed nothing of importance as an etiologic factor. Following in the footsteps of many of those unfortunates afflicted with epilepsy, she degenerated into a state of almost absolute imbecility.

"Some degree of mental deficiency seems usually to accompany athetosis, even when uncomplicated by any other degenerating neurosis. Athetoid symptoms of an aggravated character, involving both upper and both lower extremities, had developed previous to her admission into this hospital, but it was impossible to find out when and how they began. She had never had, to the knowledge of her friends, an attack of 'apoplexy,' nor of paralysis. The head was symmetric, and without scars thereon. The pedal extremities involuntarily assumed various distorted positions and were constantly in motion. The toes were usually in a state of tonic spasm,—contracted, and drawn downward or extended, pointing upward, and slightly separated. Irregular alternate extension and flexion of the toes were marked. The feet were moved upon the ankles in a stiff and awkward manner. During these 'complex involuntary movements,' the muscles of the calf became hard and rigid. The act of walking was accomplished with considerable difficulty, on account of contractures, and because the feet were not exactly under the control of the will. The unnatural movements of the hands corresponded to those of the lower extremities, though they were more constant and active. The fingers, including the thumbs, were usually widely separated and extended, though they were sometimes slightly flexed. The hands were continually in slow, methodic, quasi-rhythmic motion, never remaining long in the same attitude. In grasping an object the palm of the hand was used, it being difficult to approximate the digits. The wrist-joints were also implicated, there being alternate flexion and extension. In fact these odd contortions affected the entire limb from the shoulder to the digital extremities. When standing or walking the arms were held out horizontally, as if to maintain the equilibrium of the body. The patient's general physical health was fairly good. She frequently complained of headache, and when she was exceedingly irritable and violent all the athetoid movements would be intensified. Speech was jerky and disordered, which gave it a distinctive character. The special senses seemed to be unimpaired, and the pupils were normal, except when an epileptic attack came on. Death occurred in January, 1895, after an obstinate attack of status epilepticus."

Paramyoclonus multiplex is a condition of chronic muscular spasm affecting the trunk, occasionally the muscles of the face, abdomen, or diaphragm. The muscles affected are usually in the trunk and in the limbs, and not in the toes and hand; occasionally the movements are tonic as well as clonic; the degree of spasm varies greatly, and according to Gray may sometimes be so violent as to throw the patient down or out of the chair.

Saltatoric spasm is an extremely rare condition, first observed by Bamberger in 1859. The calf, hip, knee, and back-muscles are affected by clonic spasm, causing springing or jumping movements when the patient attempts to stand. The disease is transient, and there are no mental symptoms.

Progressive muscular atrophy has been observed as far back as Hippocrates, but it is only in recent times that we have had any definite knowledge

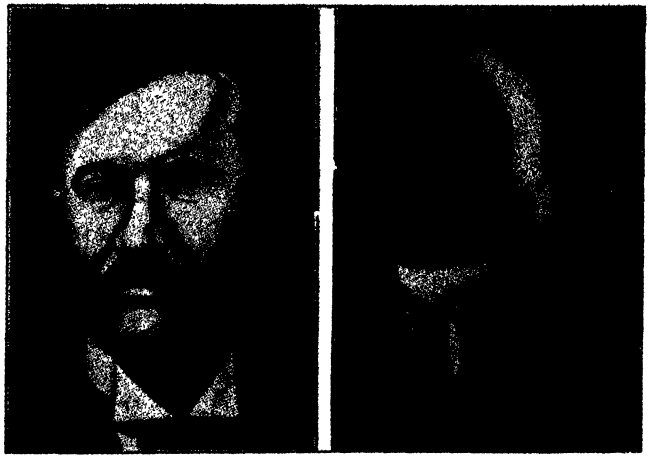


Fig. 295.—Facial hemiatrophy (Dana).

of the subject. It is divided into four types, the hand type (causing the griffin- or claw-hand, or the ape-hand); the juvenile type (generally in the muscles of the shoulder and arm); the facial type; and the peroneal type. Generalized progressive atrophy leads to a condition that simulates the appearance of a "living skeleton."

Facial hemiatrophy is an incurable disease, as yet of unknown pathology. It consists of wasting of the bones, subcutaneous tissues, and muscles of one-half of the face or head, the muscles suffering but slightly. The accompanying illustration (Fig. 295) shows a case in which there was osseous depression of the cranium and a localized alopecia. The disease is very rare, only about 100 cases having been reported. Of five cases seen by Dana, three were in females and two in males; in all the cases that could be found the origin was between the tenth and twentieth years. It is a chronic

affection, usually beginning in early life, increasing slowly for years, and then becoming stationary. It is distinguished from one-sided muscular atrophy by the electric reaction, which is not lost in the facial muscles in facial hemiatrophy, and there is no atrophy of other muscles of the body.

Burr [a] contributes an exhaustive paper on **hemiatrophy of the tongue** with report of a case as follows: "L. B., female, mulatto, thirty-one years old, married, came to the Medico-Chirurgical Hospital, Philadelphia, September 23, 1895, complaining that her 'tongue was crooked.' Save that she had had syphilis, her personal history is negative. In February, 1895, she began to suffer from headache, usually behind the left ear, and often preventing sleep. At times there is quite severe vertigo. Several weeks after the onset, headache persisting, she awoke in the night and found the left side of the tongue swollen, black, and painless. For some hours she could neither speak nor chew, but breathing was not interfered with. After a few days all symptoms passed away except headache, and she thought no more of the matter until recently, as stated above, she noticed by accident that her tongue was deformed. She is a spare, poorly-fed, muddy-skinned mulatto girl. The left half of the tongue is only about one-half as large as the right. The upper surface is irregularly depressed and elevated. There are no scars. When protruded it turns sharply to the left. Fibrillary twitching is not present. The mucous membrane is normal. Common sensation and taste are preserved. The pharyngeal reflex is present. The palate moves well. There is no palsy or wasting of the face. The pupils are of normal size and react well to light and with accommodation. Station and gait are normal. There is no incoordination of movement in the arms or legs. The knee-jerks are much increased. There is an attempt at, but no true, clonus; that is, passive flexion of the foot causes two or three jerky movements. There is no glandular swelling or tumor about the jaw or in the neck. Touch and pain-sense are normal in the face and hands, but she complains of numbness in the hands as if she had on tight gloves. There is no trouble in speaking, chewing, or swallowing. There is no pain or rigidity in the neck muscles. Examination of the pharynx reveals no disease of the bones. Under specific treatment the patient improved."

Astasia-abasia was named by Blocq, who collected 11 cases. According to Knapp, four cases have been reported in America. The disease consists in an inability to stand erect or walk normally, although there is no impairment of sensation, of muscular strength, or of the coordination of other muscles in walking than the lower extremities. In attempting to walk the legs become spasmodic; there are rapid flexions and extensions of the legs on the thighs, and of the thighs on the pelvis. The steps are short, and the feet drag; the body may make great oscillations if the patient stands, walks, or sits, and the head and arms make rhythmical movements; walking

[a] 466, July, 1896.

may become impossible, the patient appearing to leap up on one foot and then up on the other, the body and head oscillating as he advances; he may be able to walk cross-legged, or by raising the legs high; or to walk on his hands and feet; he may be able to walk at certain times and not at others; or to hop with both feet together; he may succeed with great strides and with the arms extended; or finally he may be able to use his legs perfectly if suspended (Gray). There are various types which have been called the paralytic, the choreic, and the saltatory. A tendency to go backward or **retropulsion** has been observed, according to Gray, as has also a tendency to go forward or **propulsion.** A curious phenomenon in this disease is that the patient can use the legs perfectly well lying in bed. The prognosis seems to be favorable.

Ménière's disease is a disease probably of the semicircular canals, characterized by nausea, vomiting, vertigo, deafness, tinnitus aurium, and various other phenomena. It is also called aural or auditory vertigo. The salient symptom is vertigo, and this varies somewhat in degree according to the portions of the ear affected. If the disease is in the labyrinth, the patient is supposed to stagger to one side, and the vertigo is paroxysmal, varying to such a degree as to cause simple reeling, or falling as if shot. Gray[a] reports the history of a patient with this sensational record: He had been a peasant in Ireland, and one day crossing one of the wide moors in a dog-cart, he was suddenly, as he thought, struck a violent blow from behind, so that he believed that he lost consciousness for some time. At all events, when he was able to get up he found his horse and cart some distance off, and, of course, not a soul in sight. Under the belief that he had been struck by some enemy he went quietly home and said nothing about it. Some time afterward, however, in crossing another lonely place he had a similar experience, and as he came to the conclusion that nobody could have been near him, he made up his mind that it was some malevolent stroke of the devil, and he consulted a priest who agreed with him in his belief, and gave him an amulet to wear. A series of similar attacks occurred and puzzled as to whether there was some diabolical agency at work, or whether he was the victim of some conspiracy, he emigrated to America; for several months he had no attacks. A new paroxysm occurring he consulted Gray, who found indubitable evidence of labyrinthine disease. The paroxysms of this disease are usually accompanied by nausea and vomiting, and on account of the paleness of the face, and the cold, clammy perspiration, attacks have frequently been mistaken for apoplexy. In disease of the middle ear the attacks are continuous rather than paroxysmal. If the disease is in the middle or internal ears, loud noises are generally heard, but if the disease is in the external ear, the noises are generally absent, and the vertigo of less degree but continuous. The prognosis varies with the location of the disease, but is always serious.

[a] "Treatise on Mental and Nervous Diseases," Phila., 1893, 522.

Human rumination has been known for many years. Bartholinus, Paullinus, Blanchard, Bonet, the Ephemerides, Fabricius Hildanus, Horstius, Morgagni, Peyer, Rhodius, Vogel, Salmuth, Percy, Laurent, and others describe it. Fabricius d'Aquapendente personally knew a victim of rumination, or, as it is generally called, **merycism.** The dissection by Bartholinus of a merycol showed nothing extraordinary in the cadaver. Winthier [a] knew a Swede of thirty-five, in Germany, apparently healthy, but who was obliged when leaving the table to retire to some remote place where he might eject his food into his mouth again, saying that it gave him the sensation of sweetest honey. The patient related that from his infancy he had been the subject of acid eructations, and at the age of thirty he commenced rumination as a means of relief. To those who are interested in the older records of these cases Percy and Laurent [b] offer the descriptions of a number of cases.

In a recent discussion before the American Neurological Association Hammond defined merycism as the functions of remastication and rumination in the human subject. He referred to several cases, among them that of the distinguished physiologist, Brown-Séquard, who acquired the habit as a result of experiments performed upon himself. Hammond reported a case of a young man who was the subject of merycism, and whose mental condition was also impaired. No special treatment was undertaken, but the patient was trephined, with the purpose of improving his mental condition. There were no unusual features connected with the operation, but it was noticed that there were no ruminations with the meals he took until the fifth day, when a slight rumination occurred. Eight days later a similar button was removed from the corresponding side of the left skull, and from that time (about six months) to the time of report, there had been no regurgitation. Whether the cure of the merycism in this case was directly due to the operations on the cranium, or the result of the mental improvement, is a question for discussion. Hammond added that, when acquired, merycism was almost invariably the result of over-eating and loading the esophagus, or the result of fast eating.

In remarks upon Hammond's paper Knapp said that two cases had come to his knowledge, both in physicians, but one of them he knew of only by hearsay. The other man, now over thirty, had regurgitated his food from early childhood, and he did not know that he had anything very unusual the matter with him until he began some investigations upon the functions and diseases of the stomach. This man was not nervous, and was certainly not an idiot. He had done active work as a physician, and called himself in perfect health. He was something of an epicure, and never suffered from indigestion. After a hearty meal the regurgitation was more marked. Food had been regurgitated, tasting as good as when first eaten, several hours after the eating. If he attempted to check the regurgitation he sometimes had a slight feeling of

[a] 302, xxxii., 530. [b] 302, xxxii., 526.

fulness in the stomach. Lloyd said that these cases were forms of neuroses, and were types of hysteric vomiting. There was no gustatory satisfaction connected with any form of hysteric vomiting that he had seen. In some of these cases of hysteric vomiting the food does not appear to enter the stomach, but is rejected by a sort of spasm of the esophagus. This has been called "esophagismus," and is apparently closely allied to this neurosis, which some have called "merycism." The President of the Association said that this would seem to be an affection common among physicians. A student friend of his who had been affected in this way, had written an elaborate monograph on the subject. He was disgusted with the habit, and finally overcame it by the exercise of his will-power.

Runge* discusses three cases of hereditary rumination. These patients belonged to three generations in the male line. The author subjected the contents of the stomach of one patient to quite an extensive analysis, without finding any abnormality of secretion.

Wakefulness.—Generally speaking, the length of time a person can go without sleep is the same as that during which he can survive without food. Persons, particularly those of an hysteric nature, are prone to make statements that they have not slept for many days, or that they never sleep at all, but a careful examination and watch during the night over these patients show that they have at least been in a drowsy, somnolent condition, which is in a measure physiologically equivalent to sleep. Accounts of long periods of wakefulness arise from time to time, but a careful examination would doubtless disprove them. As typical of these accounts, we quote one from Anderson, Indiana, December 11, 1895:—

"David Jones of this city, who attracted the attention of the entire medical profession two years ago by a sleepless spell of ninety-three days, and last year by another spell which extended over one hundred and thirty-one days, is beginning on another which he fears will be more serious than the preceding ones. He was put on the circuit jury three weeks ago, and counting to-day has not slept for twenty days and nights. He eats and talks as well as usual, and is full of business and activity. He does not experience any bad effects whatever from the spell, nor did he during his one hundred and thirty-one days. During that spell he attended to all of his farm business. He says now that he feels as though he never will sleep again. He does not seem to bother himself about the prospects of a long and tedious wake. He cannot attribute it to any one thing, but thinks that it was probably superinduced by his use of tobacco while young."

Somnambulism, or, as it has been called, noctambulation, is a curious phase of nocturnal cerebration analogous to the hypnotic state, or double consciousness occasionally observed in epileptics. Both Hippocrates and Aristotle discuss somnambulism, and it is said that the physician Galen was a vic-

* 218, May 23, 1895.

tim of this habit. Horstius, ab Heers, and many others of the older writers recorded interesting examples of this phenomenon. Schenck remarks on the particular way in which somnambulists seem to escape injury. Haller, Hoffmann, Gassendi, Caelius Rhodiginus, Pinel, Hechler, Bohn, Richter,—in fact nearly all the ancient physiologists and anatomists have written on this subject. The marvelous manifestations of somnambulism are still among the more surprising phenomena with which science has to deal. That a person deeply immersed in thought should walk and talk while apparently unconscious, excites no surprise, but that anyone should when fast asleep perform a series of complicated actions which undoubtedly demand the assistance of the senses is marvelous indeed. Often he will rise in the night, walk from room to room, go out on porticoes, and in some cases on steep roofs, where he would not dare to venture while awake. Frequently he will wander for hours through streets and fields, returning home and to bed without knowledge of anything having transpired.

The state of the eyes during somnambulism varies considerably. They are sometimes closed, sometimes half-closed, and frequently quite open; the pupil is sometimes widely dilated, sometimes contracted, sometimes natural, and for the most part insensible to light.

Somnambulism seems to be hereditary. Willis cites an example in which the father and the children were somnambulists, and in other cases several individuals in the same family have been afflicted. Horstius gives a history of three young brothers who became somnambulistic at the same epoch. A remarkable instance of somnambulism [a] was the case of a lad of sixteen and a half years who, in an attack of somnambulism, went to the stable, saddled his horse, asked for his whip, and disputed with the toll-keeper about his fare, and when he awoke had no recollection whatever of his acts, having been altogether an hour in his trance.

Marville [b] quotes the case of an Italian of thirty, melancholic, and a deep thinker, who was observed one evening in his bed. It was seen that he slept with his eyes open but fixed and immovable. His hands were cold, and his pulse extremely slow. At midnight he brusquely tore the curtains of his bed aside, dressed himself, went to his stable, and mounted a horse. Finding the gate of the court-yard closed he opened it with the aid of a large stone. Soon he dismounted, went to a billiard room, and simulated all the movements of one playing. In another room he struck with his empty hands a harpsichord, and finally returned to his bed. He appeared to be irritated when anybody made a noise, but a light placed under his nose was apparently unnoticed. He awoke if his feet were tickled, or if a horn was blown in his ear. Tissot transmits to us the example of a medical student who arose in the night, pursued his studies, and returned to bed without awaking; and there is another record of an ecclesiastic who finished his sermon in his sleep.

[a] 476, 1823, 40. [b] Mél. d'hist. et de litt., T. i., 242.

The Archbishop of Bordeaux attests the case of a young ecclesiastic who was in the habit of getting up during the night in a state of somnambulism, taking pen, ink, and paper, and composing and writing sermons. When he had finished a page he would read aloud what he had written and correct it. In order to ascertain whether the somnambulist made any use of his eyes the Archbishop held a piece of cardboard under his chin to prevent his seeing the paper upon which he was writing. He continued to write without being in the slightest degree incommoded. In this state he also copied out pieces of music, and when it happened that the words were written in too large characters and did not stand over the corresponding notes he perceived his error, blotted them out, and wrote them over again with great exactness.

Negretti, a sleep-walker, sometimes carried a candle about with him as if to furnish him light in his employment, but when a bottle was substituted he carried it, fancying that he had the candle. Another somnambulist, Castelli, was found by Dr. Sloane translating Italian and French and looking out words in his dictionary. His candle was purposely extinguished, whereupon he immediately began groping about, as if in the dark, and, although other lighted candles were in the room, he did not resume his occupation until he had relighted his candle at the fire. He was insensible to the light of every candle excepting the one upon which his attention was fixed.

Tuke tells of a school-boy who being unable to master a school-problem in geometry retired to bed still thinking of the subject; he was found late at night by his instructor on his knees pointing from spot to spot as though he were at the blackboard. He was so absorbed that he paid no attention to the light of the candle, nor to the speech addressed to him. The next morning the teacher asked him if he had finished his problem, and he replied that he had, having dreamt it and remembered the dream. There are many such stories on record. Quoted by Gray, Mesnet speaks of a suicidal attempt made in his presence by a somnambulistic woman. She made a noose of her apron, fastened one end to a chair and the other to the top of a window. She then kneeled down in prayer, made the sign of the cross, mounted a stool, and tried to hang herself. Mesnet, scientific to the utmost, allowed her to hang as long as he dared, and then stopped the performance. At another time she attempted to kill herself by violently throwing herself on the floor after having failed to fling herself out of the window. At still another time she tried poison, filling a glass with water, putting several coins into it, and hiding it after bidding farewell to her family in writing; the next night, when she was again somnambulistic, she changed her mind once more, writing to her family explaining her change of purpose. Mesnet relates some interesting experiments made upon a French sergeant in a condition of somnambulism, demonstrating the excitation of ideas in the mind through the sense of touch in the extremities. This soldier touched a table, passed his hands over it, and finding nothing on it, opened the drawer, took out a pen, found paper

and an inkstand, and taking a chair he sat down and wrote to his commanding officer speaking of his bravery, and asking for a medal. A thick metallic plate was then placed before his eyes so as to completely intercept vision. After a few minutes, during which he wrote a few words with a jumbled stroke, he stopped, but without any petulance. The plate was removed and he went on writing. Somnambulism may assume such a serious phase as to result in the commission of murder. There is a case [a] of a man of twenty-seven, of steady habits, who killed his child when in a state of somnambulism. He was put on trial for murder, and some of the most remarkable facts of his somnambulistic feats were elicited in the evidence. It is said that once when a boy he arose at night while asleep, dressed himself, took a pitcher and went for milk to a neighboring farm, as was his custom. At another time he worked in a lumber-yard in a rain-storm while asleep. Again, when about twenty-one, he was seen in a mill-pond wading about attempting to save his sister who he imagined was drowning. The worst phase of his somnambulism was the impending fears and terrible visions to which he was subjected. Sometimes he would imagine that the house was on fire and the walls about to fall upon him, or that a wild beast was attacking his wife and child; and he would fight, screaming inarticulately all the while. He would chase the imaginary beast about the room, and in fact had grasped one of his companions, apparently believing he was in a struggle with a wild beast. He had often injured himself in these struggles, and had often attacked his father, his wife, sister, fellow-lodgers, and while confined in jail he attacked one of his fellow-prisoners. His eyes would always be wide open and staring; he was always able to avoid pieces of furniture which were in his way, and he occasionally threw them at his visionary enemies. At the time of the murder of his child, in a somnambulistic attack, he imagined that he saw a wild beast rise up from the floor and fly at his child, a babe of eighteen months. He sprang at the beast and dashed it to the ground, and when awakened, to his horror and overwhelming grief he found that he had killed his beloved baby. A similar record has been reported of a student who attempted during the night to stab his teacher; the man was disarmed and locked up in another portion of the building; but he had not the slightest remembrance of the events of the night.

Yellowlees [b] speaks of homicide by a somnambulist. According to a prominent New York paper, one of the most singular and at the same time sad cases of somnambulism occurred a few years ago near Bakersville, N. C. A young man there named Garland had been in the habit of walking in his sleep since childhood. Like most other sleep-walkers when unmolested, his ramblings had been without harm to himself or others. Consequently his wife paid little attention to them. But finally he began to stay away from the house longer than usual and always returned soaking wet. His wife followed

[a] Glasgow Med. Jour., 1878, p. 371.

[b] 465, 1878, 451.

him one night. Leaving his home he followed the highway until he came to a rough, narrow pig-trail leading to the Tow River. His wife followed with difficulty, as he picked his way through the tangled forest, over stones and fallen trees and along the sides of precipitous cliffs. For more than a mile the sleeper trudged on until he came to a large poplar tree, which had fallen with its topmost branches far out in the river. Walking on the log until he came to a large limb extending over the water, he got down on his hands and knees and began crawling out on it. The frightened wife screamed, calling to him to wake up and come back. He was awakened by the cries, fell into the river, and was drowned. Each night for weeks he had been taking that perilous trip, crawling out on the limb, leaping from it into the river, swimming to the shore, and returning home unconscious of anything having happened.

Dreams, nightmare, and night terrors form too extensive a subject and one too well known to be discussed at length here, but it might be well to mention that sometimes dreams are said to be **pathognomonic or prodromal of approaching disease.** Cerebral hemorrhage has often been preceded by dreams of frightful calamities, and intermittent fever is often announced by persistent and terrifying dreams. Hammond has collected a large number of these prodromic dreams, seeming to indicate that before the recognizable symptoms of disease present themselves a variety of morbid dreams may occur. According to Dana, Albers says: "Frightful dreams are signs of cerebral congestion. Dreams about fire are, in women, signs of impending hemorrhage. Dreams about blood and red objects are signs of inflammatory conditions. Dreams of distorted forms are frequently a sign of abdominal obstruction and diseases of the liver."

Catalepsy, trance, and lethargy, lasting for days or weeks, are really examples of spontaneously developed mesmeric sleep in hysteric patients or subjects of incipient insanity. If the phenomenon in these cases takes the form of catalepsy there is a waxy-like rigidity of the muscles which will allow the limbs to be placed in various positions, and maintain them so for minutes or even hours. In lethargy or trance-states the patient may be plunged into a deep and prolonged unconsciousness lasting from a few hours to several years. It is in this condition that the lay journals find argument for their stories of premature burial, and from the same source the fabulous "sleeping girls" of the newspapers arise. Dana says that some persons are in the habit of going into a mesmeric sleep spontaneously. In these states there may be a lowering of bodily temperature, a retarding of the respiration and heart-action, and excessive sluggishness of the action of the bowels. The patients can hear and may respond to suggestions, though apparently insensible to painful impressions, and do not appear to smell, taste, or see; the eyes are closed, turned upward, and the pupils contracted as in normal sleep.

This subject has been investigated by such authorities as Weir Mitchell

and Hammond, and medical literature is full of interesting cases, many differing in the physiologic phenomena exhibited; some of the most striking of these will be quoted. Van Kasthoven of Leyden reports a strange case of a peasant of Wolkwig who, it is alleged, fell asleep on June 29, 1706, awakening on January 11, 1707, only to fall asleep again until March 15th of the same year. Tuke has resurrected the remarkable case reported by Arnold of Leicester, early in this century. The patient's name was John Engelbrecht. This man passed into a condition of catalepsy in which he heard everything about him distinctly, but in his imagination he seemed to have passed away to another world, this condition coming on with a suddenness which he describes as with "far more swiftness than any arrow can fly when discharged from a cross-bow." He also lost his sensation from the head downward, and recovered it in the opposite direction. At Bologna there was observed the case of a young female who after a profound grief had for forty-two successive days a state of catalepsy lasting from midday to midnight.[a] Muller of Lowenburg[468] records a case of lethargy in a young female, following a sudden fright in her fourteenth year, and abrupt suppression of menstruation. This girl was really in a sleep for four years. In the first year she was awake from one minute to six hours during the day. In the second and third years she averaged four hours wakefulness in ninety-six hours. She took very little nourishment and sometimes had no bowel-movement for sixteen days. Scull[b] reports the history of a man of twenty-seven suffering with incipient phthisis, who remained bedridden and in a state of unconsciousness for fifteen months. One day while being fed he spoke out and asked for a glass of water in his usual manner, and so frightened his sister that she ran from the room. The man had remembered nothing that had occurred during the fifteen months, and asked who was president and seemed eager for news. One curious fact was that he remembered a field of oats which was just sprouting about the time he fell in the trance. The same field was now standing in corn knee-high. After his recovery from the trance he rapidly became worse and died in eighteen months. There is a record[c] of a man near Rochester, N. Y., who slept for five years, never waking for more than sixteen hours at a time, and then only at intervals of six weeks or over. When seized with his trance he weighed 160, but he dwindled down to 90 pounds. He passed urine once or twice a day, and had a stool once in from six to twenty days. Even such severe treatment as counter-irritation proved of no avail. Gunson[d] mentions a man of forty-four, a healthy farmer, who, after being very wet and not changing his clothes, contracted a severe cold and entered into a long and deep sleep lasting for twelve hours at a time, during which it was impossible to waken him. This attack lasted eight or nine months, but in 1848 there was a recurrence accompanied by a slight trismus which lasted over eighteen months, and again

[a] 476, 1832–33, i., 663. [b] 131, 1874. [c] 596, 1853. [d] 224, June 13, 1863.

in 1860 he was subjected to periods of sleep lasting over twenty-four hours at a time. Blaudet[a] describes a young woman of eighteen who slept forty days, and again after her marriage in her twentieth year she slept for fifty days; it was necessary to draw a tooth to feed her. Four years later, on Easter day, 1862, she became insensible for twelve months, with the exception of the eighth day, when she awoke and ate at the table, but fell asleep in the chair. Her sleep was so deep that nothing seemed to disturb her; her pulse was slow, the respirations scarcely perceptible, and there were apparently no evacuations.

Weir Mitchell[b] collected 18 cases of protracted sleep, the longest continuing uninterruptedly for six months. Chilton's case lasted seventeen weeks. Six of the 18 cases passed a large part of each day in sleep, one case twenty-one hours, and another twenty-three hours. The patients were below middle life; ten were females, seven males, and one was a child whose sex was not given. Eight of the 18 recovered easily and completely, two recovered with loss of intellect, one fell a victim to apoplexy four months after awakening, one recovered with insomnia as a sequel, and four died in sleep. One recovered suddenly after six months' sleep and began to talk, resuming the train of thought where it had been interrupted by slumber. Mitchell reports a case in an unmarried woman of forty-five. She was a seamstress of dark complexion and never had any previous symptoms. On July 20, 1865, she became seasick in a gale of wind on the Hudson, and this was followed by an occasional loss of sight and by giddiness. Finally, in November she slept from Wednesday night to Monday at noon, and died a few days later. Jones of New Orleans[c] relates the case of a girl of twenty-seven who had been asleep for the last eighteen years, only waking at certain intervals, and then remaining awake from seven to ten minutes. The sleep commenced at the age of nine, after repeated large doses of quinin and morphin. Periods of consciousness were regular, waking at 6 A. M. and every hour thereafter until noon, then at 3 P. M., again at sunset, and at 9 P. M., and once or twice before morning. The sleep was deep, and nothing seemed to arouse her. Gairdner[d] mentions the case of a woman who, for one hundred and sixty days, remained in a lethargic stupor, being only a mindless automaton. Her life was maintained by means of the stomach tube. The Revue d'Hypnotisme contains the report of a young woman of twenty-five, who was completing the fourth year of an uninterrupted trance. She began May 30, 1883, after a fright, and on the same day, after several convulsive attacks, she fell into a profound sleep, during which she was kept alive by small quantities of liquid food, which she swallowed automatically. The excretions were greatly diminished, and menstruation was suppressed. There is a case reported[e] of a Spanish soldier of twenty-two, confined in the Mili-

[a] 548, 1864, ii., 518. [b] 768, iii. [c] 538, May 1, 1869.
[d] 476, 1884, i., 5. [e] Quoted 476, 1885, ii., 354.

tary Hospital of San Ambrosio, Cuba, who had been in a cataleptic state for fourteen months. His body would remain in any position in which it was placed; defecation and micturition were normal; he occasionally sneezed or coughed, and is reported to have uttered some words at night. The strange feature of this case was that the man was regularly nourished and increased in weight ten pounds. It was noted that, some months before, this patient was injured and had suffered extreme depression, which was attributed to nostalgia, after which he began to have intermittent and temporary attacks, which culminated as related. Camuset and Planés in January, 1896,[144] mention a man who began to have grand hallucinations in 1883. In March, 1884, he exhibited the first signs of sleep, and on March 10th it was necessary to put him to bed, where he remained, more or less continuously for three months, awakening gradually, and regaining his normal condition by the middle of June. He was fed by hand three times daily, was placed on a night-chair, and with one exception never evacuated in bed. Five months afterward he showed no signs of relapse. The latest report of a "sleeping girl" is that of the young Dutch maiden, Maria Cvetskens, of Stevenswerth, who on December 5, 1895, had been asleep for two hundred and twenty days. She had been visited by a number of men of good professional standing who, although differing as to the cause of her prolonged sleep, universally agreed that there was no deception in the case. Her parents were of excellent repute, and it had never occurred to them to make any financial profit out of the unnatural state of their daughter.

Hypnotism.—The phenomenon of hypnotism was doubtless known to the Oriental nations, and even to the Greeks, Romans, and Egyptians, as well as to other nations since the downfall of the Roman Empire. "The fakirs of India, the musicians of Persia, the oracles of Greece, the seers of Rome, the priests and priestesses of Egypt, the monastic recluses of the Middle Ages, the ecstatics of the seventeenth and early part of the eighteenth century exhibited many symptoms that were, and are still, attributed by religious enthusiasts to supernatural agencies, but which are explainable by what we know of hypnotism. The Hesychasts of Mount Athos who remained motionless for days with their gaze directed steadily to the navel; the Taskodrugites who remained statuesque for a long period with the finger applied to the nose; the Jogins who could hibernate at will; the Dandins of India who became cataleptoid by 12,000 repetitions of the sacred word 'Om;' St. Simeon Stylites who, perched on a lofty pillar, preserved an attitude of saint-like withdrawal from earthly things for days; and even Socrates, of whom it was said that he would stand for hours motionless and wordless—all these are probable instances of autohypnotism." (Gray.)

Hypnotism is spoken of as a morbid mental state artificially produced, and characterized by perversion or suspension of consciousness, and abeyance of volition; a condition of suggestibility leads the patient to yield

readily to commands of external sense-impressions, and there is intense concentration of the mental faculties upon some idea or feeling. There are several methods of inducing hypnosis, one of which is to give particular direction to the subject's imagination by concentrating the attention upon an arbitrary point, or by raising an image of the hypnotic state in the patient's mind. The latter is most readily induced by speech. Faria formerly strained the attention of the subject as much as possible, and suddenly called out, "Sleep!" This method has been used by others. Physical methods consist of certain stimuli of sight, hearing, and touch. Taste and smell have generally given negative results. Fixation of the gaze has been the most successful, but the ticking of a watch has been used. According to Moll, among uncivilized races particular instruments are used to produce similar states, for example, the magic drum's sound among the Lapps, or among other races the monotony of rhythm in song, etc. Instead of these continuous, monotonous, weak stimulations of the senses, we find also that sudden and violent ones are made use of—for example in the Salpêtrière, the field of Charcot's work, the loud noise of a gong, or a sudden ray of light; however, it is more than doubtful whether these sudden, strong, physical stimuli, without any mental stimuli, can induce hypnosis. Perhaps we have to do here with states not far removed from paralysis from fright. The sense of touch is also brought into play in hypnosis; Richet set great value on the so-called mesmeric strokes or passes. It is often stated that touches on the forehead induce a sleepy state in many persons. Hypnotism is practised by stimulation of the muscular sense, such as cradle-rocking, used to send little children to sleep. Similar states are said to be produced among uncivilized people by violent whirling or dancing movements; the movements are, however, accompanied by music and other mental excitations.

Hypnosis is spoken of by Huc and Hellwald of the Buddhist convents in Thibet; and Sperling, who has had a particularly wide experience in the field of hypnotism, and whose opinion is of particular value, says that he has seen dervishes in Constantinople who, from the expression of their eyes and their whole appearance, as well as from peculiar postures they maintain for a long time, impressed him as being in a hypnotic state. The state may have been induced by singing and uniform whirling motions. Hildebrandt, Jacolliot, Fischer, Hellwald, and other trustworthy witnesses and authors tell us strange things about the fakirs of India, which set any attempt at explanation on the basis of our present scientific knowledge at defiance—that is, if we decline to accept them as mere juggler's tricks. Hypnotism seems to be the only explanation. It is a well known fact that both wild and domestic beasts can be hypnotized and the success of some of the animal-tamers is due to this fact. In hypnotism we see a probable explanation for the faith-cures which have extended over many centuries, and have their analogy in the supposed therapeutic powers of the Saints.

The medicolegal aspect of hypnotism may be called in to answer whether crime may be committed at suggestion. Such examples have already been before the public in the recent trial of the Parisian strangler, Eyraud. It was claimed that his accomplice in the crime, Gabrielle Bompard, had been hypnotized. Bernheim narrates a case of outrage effected in the hypnotic condition, which was brought to light by a trial in the South of France.

As to the therapeutic value of hypnotism, with the exception of some minor benefits in hysteric cases and in insomnia, the authors must confess that its use in Medicine seems very limited.

African sleep-sickness is a peculiar disorder, apparently infectious in character, which occurs among the negroes of the western coast of Africa. It has been transported to other regions but is endemic in Africa. According to Dana it begins gradually with malaise and headache. Soon there is drowsiness after meals which increases until the patient is nearly all the time in a stupor. When awake he is dull and apathetic. There is no fever; the temperature may be subnormal. The pulse, too, is not rapid, the skin is dry, the tongue moist but coated, the bowels regular. The eyes become congested and prominent. The cervical glands enlarge. The disease ends in coma and death. Recovery rarely occurs. Sometimes the disease is more violent, and toward the end there are epileptic convulsions and muscular tremors. Autopsies have revealed no pathologic changes.

Recently Forbes [a] contributes an interesting paper on the sleeping sickness of Africa. The disease may occur in either sex and at any age, though it is most frequent from the twelfth to the twentieth years, and in the male sex. It begins with enlargement of the cervical glands, and drowsiness and sleep at unusual hours. At first the patient may be aroused, but later sinks into a heavy stupor or coma. Death occurs in from three to twelve months, and is due to starvation. Forbes reports 11 fatal cases, and two that passed from observation. At the autopsy are found hyperemia of the arachnoid, and slight chronic leptomeningitis and pachymeningitis. There is also anemia of the brain-substance. In one of his cases the spleen was enlarged. He was inclined to regard the disease as a neurosis.

Aphasia is a disease of the faculty of language, that is, a disturbance of the processes by which we see, hear, and at the same time appreciate the meaning of symbols. It includes also the faculty of expressing our ideas to others by means of the voice, gesture, writing, etc. The trouble may be central or in the conducting media. The varieties of aphasia are:—

(1) Amnesia of speech.

(2) Amnesia of speech and written language.

(3) Amnesia of speech, written language, and gesture.

In most cases there is no paralysis of the tongue or speech-forming organs. As a rule the intellect is unaffected, the patient has the ideas, but lacks the

[a] 476, May 19, 1894.

power to give them proper expression through words, written language, or gesture. If the patient is unable to write, the condition is known as agraphia. Word-blindness, word-deafness, etc., are terms of different forms of aphasia.

What was probably a case of incomplete aphasia is mentioned by Pliny, that of Messala Corvinus who was unable to tell his own name; and many instances of persons forgetting their names are really nothing but cases of temporary or incomplete aphasia. In some cases of incomplete and in nearly all cases of complete aphasia, involuntary sentences are ejaculated. According to Seguin [a] a reverend old gentleman affected with amnesia of words was forced to utter after the sentence, "Our Father who art in heaven," the words "let Him stay there." A lady seen by Trousseau would rise on the coming of a visitor to receive him with a pleased and amiable expression of countenance, and show him to a chair, at the same time addressing to him the words, "*cochon, animal, fichue bête,*" French words hardly allowable in drawing-room usage. She was totally aphasic but not paralyzed. Women often use semi-religious expressions like "Oh dear," or "Oh Lord." Men of the lower classes retain their favorite oaths remarkably. Sometimes the phrases ejaculated are meaningless, as in Broca's celebrated case.

Aphasia may be the result of sudden strong emotions, in such cases being usually temporary; it may be traumatic; it may be the result of either primary or secondary malnutrition or degeneration.

There are some cases on record in which the sudden loss and the sudden return of the voice are quite marvelous.

Habershon [b] reports the case of a woman who on seeing one of her children scalded fell unconscious and motionless, and remained without food for three days. It was then found that she suffered from complete aphasia. Five weeks after the incident she could articulate only in a very limited vocabulary.

In the Philosophical Transactions Archdeacon Squire tells of the case of Henry Axford, who lost the power of articulation for four years; after a horrible dream following a debauch he immediately regained his voice, and thereafter he was able to articulate without difficulty.

Ball [c] records a curious case of what he calls hysteric aphonia. The patient was a young lady who for several months could neither sing nor speak, but on hearing her sister sing a favorite song, she began to sing herself; but, although she could sing, speech did not return for several weeks. Ball remarks that during sleep such patients may cry out loudly in the natural voice.

Wadham [d] reports the case of a boy of eighteen who was admitted to his ward suffering with hemiplegia of the left side. Aphasia developed several days after admission and continued complete for three months. The boy

[a] Quart. Jour. Psych. Med., N. Y., 1868, ii., 74.
[b] 476, 1870, ii., 402.
[c] 476, 1889, i., 373.
[d] 700, 1869, iv., 245.

gradually but imperfectly recovered his speech. Over six months after the original admission he was readmitted with necrosis of the jaw, for which he underwent operation, and was discharged a month later. From this time on he became progressively emaciated until his death, twelve months after Wadham first saw him. A postmortem examination showed nearly total destruction of the Island of Reil, popularly called the speech-center. Jackson [a] mentions a hemiplegic patient with aphasia who could only utter the words "come on to me," "come on," and "yes" and "no." Bristowe [b] cites the history of a sailor of thirty-six, a patient of St. Thomas Hospital, London, who suffered from aphasia for nine months. His case was carefully explained to him and he nodded assent to all the explanations of the process of speech as though he understood all thoroughly. He was gradually educated to speak again by practising the various sounds. It may be worth while to state that after restoration of speech he spoke with his original American accent.

Ogle [c] quotes six cases of **loss of speech after bites of venomous snakes.** Two of the patients recovered. According to Russ [d] this strange symptom is sometimes instantaneous and in other instances it only appears after an interval of several hours. In those who survive the effects of the venom it lasts for an indefinite period. One man seen by Russ had not only lost his speech in consequence of the bite of a fer-de-lance snake, but had become, and still remained, hemiplegic. In the rest of Russ's cases speech alone was abolished. Russ remarks that the intelligence was altogether intact, and sensibility and power of motion were unaffected. One woman who had been thus condemned to silence, suddenly under the influence of a strong excitement recovered her speech, but when the emotion passed away speech again left her. Ogle accounts for this peculiar manifestation of aphasia by supposing that the poison produces spasm of the middle cerebral arteries, and when the symptom remains a permanent defect the continuance of the aphasia is probably due to thrombosis of arteries above the temporary constriction.

Anosmia, or loss of smell, is the most common disorder of olfaction; it may be caused by cortical lesions, olfactory nerve-changes, congenital absence, or over-stimulation of the nerves, or it may be a symptom of hysteria.

Ogle,[e] after mentioning several cases of traumatic anosmia, suggests that a blow on the occiput is generally the cause. Legg [f] reports a confirmatory case, but of six cases mentioned by Notta [g] two were caused by a blow on the crown of the head, and two on the right ear. The prognosis in traumatic anosmia is generally bad, although there is a record [h] of a man who fell while working on a wharf, striking his head and producing anosmia with partial loss of hearing and sight, and who for several weeks neither smelt nor tasted, but gradually recovered.

[a] 476, March 17, 1868.
[b] 767, 1870, iii., 92.
[c] 700, 1868, iii., 167.
[d] 243, 1861, 220.
[e] 550, vol. liii., 1870, 264.
[f] 476, 1873, ii., 689.
[g] 162, April, 1870, 385.
[h] 218, 1878.

Mitchell[a] reports a case of a woman of forty who, after an injury to her nose from a fall, suffered persistent headache and loss of smell. Two years later, at bedtime, or on going to sleep, she had a sense of horrible odors, which were fecal or animal, and most intense in nature. The case terminated in melancholia, with delirium of persecution, during which the disturbance of smell passed away.

Anosmia has been noticed in leukoderma and allied disturbances of pigmentation. Ogle[b] mentions a negro boy in Kentucky whose sense of smell decreased as the leukoderma extended. Influenza, causing adhesions of the posterior pillars of the fauces, has given rise to anosmia.

Occasionally overstimulation of the olfactory system may lead to anosmia. Graves[c] mentions a captain of the yeomanry corps who while investigating the report that 500 pikes were concealed at the bottom of a cesspool in one of the city markets superintended the emptying of the cesspool, at the bottom of which the arms were found. He suffered greatly from the abominable effluvia, and for thirty-six years afterward he remained completely deprived of the sense of smell.

In a discussion upon anosmia before the Medico-Chirurgical Association of London, January 25, 1870, there was an anosmic patient mentioned who was very fond of the bouquet of moselle, and Carter mentioned that he knew a man who had lost both the senses of taste and smell, but who claimed that he enjoyed putrescent meat. Leared spoke of a case in an epileptic affected with loss of taste and smell, and whose paroxysms were always preceded by an odor of peach-blossoms.

Hyperosmia is an increase in the perception of smell, which rarely occurs in persons other than the hysteric and insane. It may be cultivated as a compensatory process, as in the blind, or those engaged in particular pursuits, such as tea-tasting. **Parosmia** is a rare condition, most often a symptom of hysteria or neurasthenia, in which everything smells of a similar, peculiar, offensive odor. Hallucinations of odor are sometimes noticed in the insane. They form most obstinate cases, when the hallucination gives rise to imaginary disagreeable, personal odors.

Perversion of the tactile sense, or wrong reference to the sensation of pain, has occasionally been noticed. The Ephemerides records a case in which there was the sense of two objects from a single touch on the hypochondrium. Weir Mitchell[d] remarks that soldiers often misplace the location of pain after injuries in battle. He also mentions several cases of wrong reference of the sensation of pain. These instances cannot be called reflex disturbances, and are most interesting. In one case the patient felt the pain from a urethral injection in gonorrhea, on the top of the head. In another an individual let an omnibus-window fall on his finger, causing but brief pain in the finger, but violent pains in the face and neck of that side. Mitchell

[a] 124, 1890. [b] 550, 1870, 263. [c] 309, 1884, vi., 69. [d] 533, March 16, 1895.

also mentions a naturalist of distinction who had a small mole on one leg which, if roughly rubbed or pinched, invariably seemed to cause a sharp pain in the chin.

Nostalgia is the name generally given to that variety of melancholia in which there is an intense longing for home or country. This subject has apparently been overlooked in recent years, but in the olden times it was extensively discussed. Swinger, Harderus, Tackius, Guerbois, Hueber, Therrin, Castellanau, Pauquet, and others have written extensively upon this theme. It is said that the inhabitants of cold countries, such as the Laplanders and the Danes, are the most susceptible to this malady. For a long time many writers spoke of the frequency and intensity of nostalgia among the Swiss. Numerous cases of suicide from this affliction have been noticed among these hardy mountaineers, particularly on hearing the mountain-song of their homes, "Ranz des vaches." This statement, which is an established fact, is possibly due to the social constitution of the Swiss mountaineers, who are brought up to a solitary home life, and who universally exhibit great attachment to and dependence upon their parents and immediate family. In the European armies nostalgia has always been a factor in mortality. In the Army of the Moselle, and in Napoleon's Alpine Army, the terrible ravages of suicide among the young Bretons affected with nostalgia have been recorded; it is among the French people that most of the investigation on this subject has been done. Moreau speaks of a young soldier in a foreign country and army who fell into a most profound melancholy when, by accident, he heard his native tongue. According to Swinger and Sauvages women are less subject to nostalgia than men. Nostalgia has been frequently recorded in hospital wards. Percy and Laurent [a] have discussed this subject very thoroughly, and cite several interesting cases among emigrants, soldiers, marines, etc. Hamilton [b] speaks of a recruit who became prostrated by longing for his home in Wales. He continually raved, but recovered from his delirium when assured by the hospital authorities of his forthcoming furlough. Taylor [c] records two cases of fatal nostalgia. One of the victims was a Union refugee who went to Kentucky from his home in Tennessee. He died talking about and pining for his home. The second patient was a member of a regiment of colored infantry; he died after repeatedly pining for his old home.

Animals are sometimes subject to nostalgia, and instances are on record in which purchasers have been compelled to return them to the old home on account of their literal home-sickness. Oswald tells of a bear who, in the presence of food, committed suicide by starvation.

Hypochondria consists of a mild form of insanity in which there is a tendency to exaggerate the various sensations of the body and their importance, their exaggeration being at times so great as to amount to actual

[a] 302, xxxvi. [b] 524, 1787, 343. [c] Amer. Med. Bi-Weekly, 1879, 121.

delusion. All sorts of symptoms are dwelt upon, and the doctor is pestered to the extreme by the morbid fears of the patient.

Morbid fears or impulses, called by the Germans *Zwangsvorstellungen,* or *Zwangshandlungen,* and by the French, *peurs maladies,* have only been quite recently studied, and form most interesting cases of minor insanity. Gélineau [370] has made extensive investigations in this subject, and free reference has been made to his work in the preparation of the following material.

Aichmophobia is a name given by the French to the fear of the sight of any sharp-pointed instrument, such as a pin, needle, fish-spine, or naked sword. An illustrious sufferer of this 'phobia was James I. of England, who could never tolerate the appearance of a drawn sword. Gélineau reports an interesting case of a female who contracted this malady after the fatigue of lactation of two children. She could not tolerate knives, forks, or any pointed instruments on the table, and was apparently rendered helpless in needle-work on account of her inability to look at the pointed needle.

Agoraphobia is dread of an open space, and is sometimes called **Kenophobia.** The celebrated philosopher Pascal was supposed to have been affected with this fear. In agoraphobia the patient dreads to go across a street or into a field, is seized with an intense feeling of fright, and has to run to a wall or fall down, being quite unable to proceed. There is violent palpitation, and a feeling of constriction is experienced. According to Suckling, pallor and profuse perspiration are usually present, but there is no vertigo, confusion of mind, or loss of consciousness. The patient is quite conscious of the foolishness of the fears, but is unable to overcome them. The will is in abeyance and is quite subservient to the violent emotional disturbances. Gray mentions a patient who could not go over the Brooklyn Bridge or indeed over any bridge without terror. Roussel speaks of a married woman who had never had any children, and who was apparently healthy, but who for the past six months had not been able to put her head out of the window or go upon a balcony. When she descended into the street she was unable to traverse the open spaces. Chazarin mentions a case in a woman of fifty, without any other apparent symptom of diathesis. Gélineau [370] quotes a case of agoraphobia, secondary to rheumatism, in a woman of thirty-nine. There is a corresponding fear of high places often noticed, called **acrophobia**; so that many people dare not trust themselves on high buildings or other eminences.

Thalassophobia is the fear of the view of immense spaces or uninterrupted expanses. The Emperor Heraclius, at the age of fifty-nine, had an insurmountable fear of the view of the sea; and it is said that when he crossed the Bosphorus a bridge of boats was formed, garnished on both sides with plants and trees, obscuring all view of the water over which the Emperor peacefully traversed on horseback. The moralist Nicole, was equally a thalassophobe, and always had to close his eyes at the sight of a large sheet

of water, when he was seized with trembling in all his limbs. Occasionally some accident in youth has led to an aversion to traversing large sheets of water, and there have been instances in which persons who have fallen into the water in childhood have all their lives had a terror of crossing bridges.

Claustrophobia is the antithesis of agoraphobia. Raggi[a] describes a case of such a mental condition in a patient who could not endure being within an enclosure or small space. Suckling[b] mentions a patient of fifty-six who suffered from palpitation when shut in a railway carriage or in a small room. She could only travel by rail or go into a small room so long as the doors were not locked, and on the railroad she had to bribe the guard to leave the doors unlocked. The attacks were purely mental, for the woman could be deceived into believing that the door to a railroad carriage was unlocked, and then the attack would immediately subside. Suckling also mentions a young woman brought to him at Queen's Hospital who had a great fear of death on getting into a tram car, and was seized with palpitation and trembling on merely seeing the car. This patient had been in an asylum. The case was possibly due more to fear of an accident than to true claustrophobia. Gorodoichze[c] mentions a case of claustrophobia in a woman of thirty-eight, in whose family there was a history of hereditary insanity. Ball[d] speaks of a case in a woman who was overcome with terror half way in the ascension of the Tour Saint-Jacques, when she believed the door below was closed. Gélineau quotes the case of a brave young soldier who was believed to be afraid of nothing, but who was unable to sleep in a room of which the door was closed.

Astrophobia or **astropaphobia** is a morbid fear of being struck by lightning. It was first recognized by Bruck of Westphalia, who knew a priest who was always in terror when on a country road with an unobstructed view of the sky, but who was reassured when he was under the shelter of trees. He was advised by an old physician always to use an umbrella to obstruct his view of the heavens, and in this way his journeys were made tranquil. Beard knew an old woman who had suffered all her life from astrophobia. Her grandmother had presented the same susceptibility and the same fears. Sometimes she could tell the approach of a storm by her nervous symptoms. Caligula, Augustus, Henry III., and other celebrated personages, were overcome with fear during a storm.

Mysophobia is a mild form of insanity characterized by a dread of the contact of dirt. It was named by Hammond, whose patient washed her hands innumerable times a day, so great was the fear of contamination. These patients make the closest inspection of their toilet, their eating and drinking utensils, and all their lives are intensely worried by fear of dirt.

Hematophobia is a horror of blood, which seems to be an instinctive sentiment in civilized man, but which is unknown among savages. When

[a] 363, 1878. [b] 124, 1890. [c] Jour. de l'Hypnotisme, Sept., 1893. [d] 144, 1879.

the horror is aggravated to such an extent as to cause distressing symptoms or unconsciousness, it takes the name of hematophobia. There are many cases on record and nearly every physician has seen one or more, possibly among his colleagues.

Necrophobia and **thanatophobia** are allied maladies, one being the fear of dead bodies and the other the fear of death itself.

Anthropophobia is a symptom of mental disease consisting in fear of society. Beard, Mitchell, Baillarger, and others have made observations on this disease. The antithesis of this disease is called **monophobia.** Patients are not able to remain by themselves for even the shortest length of time. This morbid dread of being alone is sometimes so great that even the presence of an infant is an alleviation. Gélineau cites an instance in a man of forty-five which was complicated with agoraphobia.

Bacillophobia is the result of abnormal pondering over bacteriology. Huchard's case was in a woman of thirty-eight who, out of curiosity, had secretly read the works of Pasteur, and who seemed to take particular pleasure in conning over the causes of death in the health-reports. Goyard mentions an instance in a Swiss veterinary surgeon.

Kleptophobia, examples of which have been cited by Cullère,[a] is the fear of stealing objects in view, and is often the prelude of **kleptomania.** The latter disease has gained notoriety in this country, and nearly every large store has agents to watch the apparently growing number of kleptomaniacs. These unfortunate persons, not seldom from the highest classes of society, are unable to combat an intense desire to purloin articles. Legal proceedings have been instituted against many, and specialists have been called into court to speak on this question. Relatives and friends have been known to notify the large stores of the thieving propensities of such patients.

Le Grande du Saulle has given to the disease in which there is a morbid doubt about everything done, the name **folie de doute.** Gray mentions a case in a patient who would go out of a door, close it, and then come back, uncertain as to whether he had closed it, close it again, go off a little way, again feel uncertain as to whether he had closed it properly, go back again, and so on for many times. Hammond relates the history of a case in an intelligent man who in undressing for bed would spend an hour or two determining whether he should first take off his coat or his shoes. In the morning he would sit for an hour with his stockings in his hands, unable to determine which he should put on first.

Syphilophobia is morbid fear of syphilis. **Lyssophobia** is a fear of hydrophobia which sometimes assumes all the symptoms of the major disease, and even produces death. Gélineau, Colin, Berillon, and others have studied cases. In Berillon's case the patient was an artist, a woman of brunet complexion, who for six years had been tormented with the fear of becoming mad, and in whom the symptoms became so intense as to constitute

[a] "Les frontières de la folie," p. 82.

pseudohydrophobia. At their subsidence she was the victim of numerous hallucinations which almost drove her to the point of suicide.

Spermatophobia has been noticed among the ignorant, caused or increased by inspection of sensational literature, treatises on the subject of spermatorrhea, etc. Ferré mentions a woman of thirty-six, of intense religious scruples, who was married at eighteen, and lost her husband six years afterward. She had a proposition of marriage which she refused, and was prostrated by the humid touch of the proposer who had kissed her hand, imagining that the humidity was due to semen. She was several times overcome by contact with men in public conveyances, her fear of contamination being so great. **Zoophobia,** or dread of certain animals, has been mentioned under another chapter under the head of idiosyncrasies. **Pantophobia** is a general state of fear of everything and everybody. **Phobophobia,** the fear of being afraid, is another coinage of the wordmakers. The minor 'phobias, such as **pyrophobia,** or fear of fire; **stasophobia,** or inability to arise and walk, the victims spending all their time in bed; **toxicophobia** or fear of poison, etc., will be left to the reader's inspection in special works on this subject.

Demonomania is a form of madness in which a person imagines himself possessed of the devil. Ancient records of this disease are frequent, and in this century Lapointe [a] reports the history of demonomania in father, mother, three sons, and two daughters, the whole family, with the exception of one son, who was a soldier, being attacked. They imagined themselves poisoned by a sorceress, saw devils, and had all sorts of hallucinations, which necessitated the confinement of the whole family in an asylum for over a month. They continued free from the hallucinations for two years, when first the mother, and then gradually all the other members of the family, again became afflicted with demonomania and were again sent to the asylum, when, after a residence therein of five months, they were all sufficiently cured to return home.

Particular aversions may be temporary only, that is, due to an existing condition of the organism, which, though morbid, is of a transitory character. Such, for instance, are those due to dentition, the commencement or cessation of the menstrual function, pregnancy, etc. These cases are frequently of a serious character, and may lead to derangement of the mind. Millington relates the history of a lady who, at the beginning of her first pregnancy, acquired an overpowering aversion to a half-breed Indian woman who was employed in the house as a servant. Whenever this woman came near her she was at once seized with violent trembling; this ended in a few minutes with vomiting and great mental and physical prostration lasting several hours. Her husband would have sent the woman away, but Mrs. X insisted on her remaining, as she was a good servant, in order that she might overcome what she regarded as an unreasonable prejudice. The effort was, however, too

[a] 144, Nov., 1846.

great, for upon one occasion when the woman entered Mrs. X's apartment rather unexpectedly, the latter became greatly excited, and, jumping from an open window in her fright, broke her arm, and otherwise injured herself so severely that she was confined to her bed for several weeks. During this period, and for some time afterward, she was almost constantly subject to hallucinations, in which the Indian woman played a prominent part. Even after her recovery the mere thought of the woman would sometimes bring on a paroxysm of trembling, and it was not till after her confinement that the antipathy disappeared.

Circular or periodic insanity is a rare psychosis. According to Drewry reports of very few cases have appeared in the medical journals. "Some systematic writers," says Drewry, "regard it as a mere subdivision of periodic insanity (Spitzka). A distinguished alienist and author of Scotland however has given us an admirable lecture on the subject. He says: 'I have had under my care altogether about 40 cases of typical *folie circulaire.*' In the asylum at Morningside there were, says Dr. Clouston, in 800 patients 16 cases of this peculiar form of mental disease. Dr. Spitzka, who was the first American to describe it, found in 2300 cases of pauper insane four per cent. to be periodic, and its sub-group, circular, insanity. Dr. Stearns states that less than one-fourth of one per cent. of cases in the Hartford (Conn.) Retreat classed as mania and melancholia have proved to be *folie circulaire.* Upon examination of the annual reports of the superintendents of hospitals for the insane in this country, in only a few are references made to this as a distinct form of insanity. In the New York State hospitals there is a regular uniform classification of mental diseases in which 'circular (alternating) insanity' occupies a place. In the report of the Buffalo Hospital for 1892, in statistical table No. 4, 'showing forms of insanity in those admitted, etc., since 1888,' out of 1428 cases, only one was 'alternating (circular) insanity.' In the St. Lawrence Hospital only one case in 992 was credited to this special class. In the institution in Philadelphia, of which Dr. Chapin is the superintendent, 10,379 patients have been treated, only three of whom were diagnosed cases of *manie circulaire.* Of the 900 cases of insanity in the State Hospital at Danville, Pa., less than four per cent. were put in this special class. There are in the Central (Va.) State Hospital (which is exclusively for the colored insane) 775 patients, three of whom are genuine cases of circular insanity, but they are included in 'periodic insanity.' This same custom evidently prevails in many of the other hospitals for the insane."

Drewry[a] reports three cases of circular insanity, one of which was as follows:—

"William F., a negro, thirty-six years old, of fair education, steady, sober habits, was seized with gloomy depression a few weeks prior to his

[a] 466, April, 1895.

admission to this hospital, in September, 1886. This condition came on after a period of fever. He was a stranger in the vicinity and scarcely any information could be obtained regarding his antecedents. When admitted he was in a state of melancholic hypochondriasis; he was the very picture of abject misery. Many imaginary ills troubled his peace of mind. He spoke of committing suicide, but evidently for the purpose of attracting attention and sympathy. On one occasion he said he intended to kill himself, but when the means to do so were placed at his command, he said he would do the deed at another time. The most trivial physical disturbances were exaggerated into very serious diseases. From this state of morbid depression he slowly emerged, grew brighter, more energetic, neater in personal appearance, etc. During this period of slow transition or partial sanity he was taken out on the farm where he proved to be a careful and industrious laborer. He escaped, and when brought back to the hospital a few weeks subsequently he was in a condition of great excitement and hilarity. His expression was animated, and he was, as it were, overflowing with superabundance of spirit, very loquacious, and incessantly moving. He bore an air of great importance and self-satisfaction; said he felt perfectly well and happy, but abused the officers for keeping him 'confined unjustly in a lunatic asylum.' It was his habit almost daily, if not interfered with, to deliver a long harangue to his fellow-patients, during which he would become very excited and noisy. He showed evidences of having a remarkable memory, particularly regarding names and dates. (Unusual memory is frequently observed in this type of insanity, says Stearns.) He was sometimes disposed to be somewhat destructive to furniture, etc., was neat in person, but would frequently dress rather 'gorgeously,' wearing feathers and the like in his hat, etc. He was not often noisy and sleepless at night, and then only for a short time. His physical health was good. This 'mental intoxication,' as it were, lasted nearly a year. After this long exacerbation of excitement there was a short remission and then depression again set in, which lasted about fifteen months. At this time this patient is in the depressed stage or period of the third circle. So, thus the cycles have continuously repeated their weary rounds, and in all probability they will keep this up 'until the final capitation in the battle of life has taken place.' "

Katatonia, according to Gray, is a cerebral disease of cyclic symptoms, ranging in succession from primary melancholia to mania, confusion, and dementia, one or more of these stages being occasionally absent, while convulsive and epileptoid symptoms accompany the mental changes.

It is manifestly impossible to enter into the manifold forms and instances of insanity in this volume, but there is one case, seldom quoted, which may be of interest. It appeared under the title, "A Modern Pygmalion." [a] It recorded a history of a man named Justin, who died in the Bicêtre Insane

[a] 476, 1879, ii., 436.

Asylum. He had been an exhibitor of wax works at Montrouge, and became deeply impressed with the beautiful proportions of the statue of a girl in his collection, and ultimately became intensely enamored with her. He would spend hours in contemplation of the inanimate object of his affections, and finally had the illusion that the figure, by movements of features, actually responded to his devotions. Nemesis as usual at last arrived, and the wife of Justin, irritated by his long neglect, in a fit of jealousy destroyed the wax figure, and this resulted in a murderous attack on his wife by Justin who resented the demolition of his love. He was finally secured and lodged in Bicêtre, where he lived for five years under the influence of his lost love.

An interesting condition, which has been studied more in France than elsewhere, is **double consciousness,** dual personality, or, as it is called by the Germans, *Doppelwahrnehmungen.* In these peculiar cases an individual at different times seems to lead absolutely different existences. The idea from a moralist's view is inculcated in Stevenson's "Dr. Jekyl and Mr. Hyde." In an article on this subject [a] Weir Mitchell illustrated his paper by examples, two of which will be quoted. The first was the case of Mary Reynolds who, when eighteen years of age, became subject to hysteric attacks, and on one occasion she continued blind and deaf for a period of five or six weeks. Her hearing returned suddenly, and her sight gradually. About three months afterward she was discovered in a profound sleep. Her memory had fled, and she was apparently a new-born individual. When she awoke it became apparent that she had totally forgotten her previous existence, her parents, her country, and the house where she lived. She might be compared to an immature child. It was necessary to recommence her education. She was taught to write, and wrote from right to left, as in the Semitic languages. She had only five or six words at her command—mere reflexes of articulation which were to her devoid of meaning. The labor of re-education, conducted methodically, lasted from seven to eight weeks. Her character had experienced as great a change as her memory; timid to excess in the first state, she became gay, unreserved, boisterous, daring, even to rashness. She strolled through the woods and the mountains, attracted by the dangers of the wild country in which she lived. Then she had a fresh attack of sleep, and returned to her first condition; she recalled all the memories and again assumed a melancholy character, which seemed to be aggravated. No conscious memory of the second state existed. A new attack brought back the second state, with the phenomenon of consciousness which accompanied it the first time. The patient passed successively a great many times from one of these states to the other. These repeated changes stretched over a period of sixteen years. At the end of that time the variations ceased. The patient was then thirty-six years of age; she lived in a mixed state, but more closely resembling the second than the first; her

[a] 768, x.

character was neither sad nor boisterous, but more reasonable. She died at the age of sixty-five years.

The second case was that of an itinerant Methodist minister named Bourne, living in Rhode Island, who one day left his home and found himself, or rather his second self, in Norristown, Pennsylvania. Having a little money, he bought a small stock in trade, and instead of being a minister of the gospel under the Methodist persuasion, he kept a candy shop under the name of A. J. Brown, paid his rent regularly, and acted like other people. At last, in the middle of the night, he awoke to his former consciousness, and finding himself in a strange place, supposed he had made a mistake and might be taken for a burglar. He was found in a state of great alarm by his neighbors, to whom he stated that he was a minister, and that his home was in Rhode Island. His friends were sent for and recognized him, and he returned to his home after an absence of two years of absolutely foreign existence. A most careful investigation of the case was made on behalf of the London Society for Psychical Research.

An exhaustive paper on this subject, written by Richard Hodgson in the proceedings of the Society for Psychical Research, states that Mr. Bourne had in early life shown a tendency to abnormal psychic conditions; but he had never before engaged in trade, and nothing could be remembered which would explain why he had assumed the name A. J. Brown, under which he did business. He had, however, been hypnotized when young and made to assume various characters on the stage, and it is possible that the name A. J. Brown was then suggested to him, the name resting in his memory, to be revived and resumed when he again went into a hypnotic trance.

Alfred Binet describes a case somewhat similar to that of Mary Reynolds: "Felida, a seamstress, from 1858 up to the present time (she is still living) has been under the care of a physician named Azam in Bordeaux. Her normal, or at least her usual, disposition when he first met her was one of melancholy and disinclination to talk, conjoined with eagerness for work. Nevertheless her actions and her answers to all questions were found to be perfectly rational. Almost every day she passed into a second state. Suddenly and without the slightest premonition save a violent pain in the temples she would fall into a profound slumber-like languor, from which she would awake in a few moments a totally different being. She was now as gay and cheery as she had formerly been morose. Her imagination was over-excited. Instead of being indifferent to everything, she had become alive to excess. In this state she remembered everything that had happened in the other similar states that had preceded it, and also during her normal life. But when at the end of an hour or two the languor reappeared, and she returned to her normal melancholy state, she could not recall anything that had happened in her second, or joyous, stage. One day, just after passing into the second stage, she attended the funeral of an acquaintance. Returning

in a cab she felt the period coming on which she calls her crisis (normal state). She dozed several seconds, without attracting the attention of the ladies who were in the cab, and awoke in the other state, absolutely at a loss to know why she was in a mourning carriage with people who, according to custom, were praising the qualities of a deceased person whose name she did not even know. Accustomed to such positions, she waited; by adroit questions she managed to understand the situation, and no one suspected what had happened. Once when in her abnormal condition she discovered that her husband had a mistress, and was so overcome that she sought to commit suicide. Yet in her normal mind she meets the woman with perfect equilibrium and forgetfulness of any cause for quarrel. It is only in her abnormal state that the jealousy recurs. As the years went on the second state became her usual condition. That which was at first accidental and abnormal now constitutes the regular center of her psychic life. It is rather satisfactory to chronicle that as between the two *egos* which alternately possess her, the more cheerful has finally reached the ascendant."

Jackson [a] reports the history of the case of a young dry-goods clerk who was seized with convulsions of a violent nature during which he became unconscious. In the course of twenty-four hours his convulsions abated, and about the third day he imagined himself in New York paying court to a lady, and having a rival for her favors; an imaginary quarrel and duel ensued. For a half-hour on each of three days he would start exactly where he had left off on the previous day. His eyes were open and to all appearances he was awake during this peculiar delirium. When asked what he had been doing he would assert that he had been asleep. His language assumed a refinement above his ordinary discourse. In proportion as his nervous system became composed, and his strength improved, this unnatural manifestation of consciousness disappeared, and he ultimately regained his health.

A further example of this psychologic phenomenon was furnished quite recently at a meeting of the Clinical Society of London, where a well known physician exhibited a girl of twelve, belonging to a family of good standing, who displayed in the most complete and indubitable form this condition of dual existence. A description of the case is as follows:—

"Last year, after a severe illness which was diagnosed to be meningitis, she became subject to temporary attacks of unconsciousness, on awakening from which she appeared in an entirely different character. In her normal condition she could read and write and speak fluently, and with comparative correctness. In the altered mental condition following the attack she loses all memory for ordinary events, though she can recall things that have taken place during previous attacks. So complete is this alteration of memory, that at first she was unable to remember her own name or to identify herself or her parents. By patient training in the abnormal condition she has

[a] 124, 1869.

been enabled to give things their names, though she still preserves a baby-fashion of pronouncing. She sometimes remains in the abnormal condition for days together and the change to her real self takes place suddenly, without exciting surprise or dismay, and she forthwith resumes possession of her memory for events of her ordinary life. During the last month or two she appears to have entered on a new phase, for after a mental blank of a fortnight's duration she awakened completely oblivious of all that had happened since June, 1895, and she alludes to events that took place just anterior to that date as though they were of recent occurrence; in fact she is living mentally in July, 1895. These cases, though rare, are of course not infrequently met with, and they have been carefully studied, especially in France, where women appear more prone to neurotic manifestations. The hypothesis that finds most favor is that the two halves of the brain do not work in unison; in other words, that there has been some interference with the connections which in the ordinary normal being make of a wonderful composite organ like the brain one organic whole."

Proust[a] tells a story of a Parisian barrister of thirty-three. His father was a heavy drinker, his mother subject to nervous attacks, his younger brother mentally deficient, and the patient himself was very impressionable. It was said that a judge in a court, by fixing his gaze on him, could send him into an abnormal state. On one occasion, while looking into a mirror in a café, he suddenly fell into a sleep, and was taken to the Charité where he was awakened. He suffered occasional loss of memory for considerable lengths of time, and underwent a change of personality during these times. Though wide awake in such conditions he could remember nothing of his past life, and when returned to his original state he could remember nothing that occurred during his secondary state, having virtually two distinct memories. On September 23, 1888, he quarreled with his stepfather in Paris and became his second self for three weeks. He found himself in a village 100 miles from Paris, remembering nothing about his journey thereto; but on inquiry he found that he had paid a visit to the priest of the village who thought his conduct odd, and he had previously stayed with an uncle, a bishop, in whose house he had broken furniture, torn up letters, and had even had sentence passed upon him by a police court for misdemeanor. During these three weeks he had spent the equivalent of $100, but he could not recall a single item of expenditure. Davies[b] cites a remarkable case of sudden loss of memory in a man who, while on his way to Australia, was found by the police in an exhausted condition and who was confined in the Kent County Insane Asylum. He suffered absolute loss of all memory with the exception of the names of two men not close acquaintances, both of whom failed to recognize him in his changed condition in confinement. Four months later his memory returned and his identity was established.

[a] Quoted 224, 1890, i., 1143.

[b] 123, 1886.

In the Revue Philosophique for 1885 there are the details of a case of a young man who seemed able to assume six states of what might be fairly called different personalities. The memories attached to each of these states were very different, though only one was completely exclusive of the others. The handwriting varied from complete competence to complete incompetence. His character varied between childish timidity, courteous reserve, and reckless arrogance; and to four of his conditions there was a form of hysteric paralysis attached. Mere suggestion would not only induce any one of these varied forms of paralysis, but also the memories, capacities, and characters habitually accompanying it.

A young man named Spencer, an inmate of the Philadelphia Hospital, was exhibited before the American Neurological Society in June, 1896, as an example of dual personality. At the time of writing he is and has been in apparently perfect health, with no evidence of having been in any other condition. His faculties seem perfect, his education manifests itself in his intelligent performance of the cleric duties assigned to him at the hospital, yet the thread of continuous recollection which connects the present moment with its predecessors—consciousness and memory—has evidently been snapped at some point of time prior to March 3d and after January 19th, the last date at which he wrote to his parents, and as if in a dream, he is now living another life. The hospital staff generally believe that the man is not "shamming," as many circumstances seem to preclude that theory. His memory is perfect as to everything back to March 3d. The theory of hypnotism was advanced in explanation of this case.

The morbid sympathy of twin brothers, illustrated in Dumas's "Corsican Brothers," has been discussed by Sedgwick, Elliotson, Trousseau, Laycock, Cagentre, and others. Marshall Hall relates what would seem to verify the Corsican myth, the history of twin brothers nine months of age, who always became simultaneously affected with restlessness, whooping and crowing in breathing three weeks previous to simultaneous convulsions, etc. Rush[a] describes a case of twin brothers dwelling in entirely different places, who had the same impulse at the same time, and who eventually committed suicide synchronously. Baunir[b] describes a similar development of suicidal tendency in twin brothers. A peculiar case of this kind was that of the twin brothers Laustand who were nurses in a hospital at Bordeaux: they invariably became ill at the same time, and suffered cataract of the lens together.[c]

Automatism has been noticed as a sequel to cranial injuries, and Huxley quotes a remarkable case reported by Mesnet.[d] The patient was a young man whose parietal bone was partially destroyed by a ball. He exhibited signs of hemiplegia on the right side, but these soon disappeared and he became subject to periodic attacks lasting from twenty-four to forty-eight

[a] 368, 1837, 559. [b] 144, 1863, No. 2. [c] 221, July, 1844, 169. [d] 362, July 17, 1874.

hours, during which he was a mere automaton. In these attacks he walked continually, incessantly moving his jaw, but not uttering a word. He was insensible to pain, electric shock, or pin-prick. If a pen was placed in his hand he would write a good letter, speaking sensibly about current topics. When a cigarette-paper was placed in his hand he sought his tobacco box, and adroitly rolled a cigarette and lighted it. If the light went out he procured another, but would not allow another to substitute a match. He allowed his mustache to be burned without resistance, but would not allow a light to be presented to him. If chopped charpie was put in his pocket instead of tobacco he knew no difference. While in his periods of automatism he was in the habit of stealing everything within his grasp. He had been a concert singer, and a peculiar fact was that if given white gloves he would carefully put them on and commence a pantomime of the actions of a singer, looking over his music, bowing, assuming his position, and then singing.

It is particularly in hypnotic subjects that manifestations of automatism are most marked. At the suggestion of battle an imaginary struggle at once begins, or if some person present is suggested as an enemy the fight is continued, the hypnotic taking care not to strike the person in question. Moll conceded that this looked like simulation, but repetition of such experiments forced him to conclude that these were real, typical hypnoses, in which, in spite of the sense-delusions, there was a dim, dreamy consciousness existing, which influenced the actions of the subject, and which prevented him from striking at a human being, although hitting at an imaginary object. Many may regard this behavior of hypnotics as pure automatism; and Moll adds that, as when walking in the street while reading we automatically avoid knocking passers-by, so the hypnotic avoids hitting another person, although he is dimly or not at all aware of his existence.

Gibbs [a] reports a curious case of lack of integrity of the will in a man of fifty-five. When he had once started on a certain labor he seemed to have no power to stop the muscular exercise that the task called forth. If he went to the barn to throw down a forkful of hay, he would never stop until the hay was exhausted or someone came to his rescue. If sent to the wood-pile for a handful of wood, he would continue to bring in wood until the pile was exhausted or the room was full. On all occasions his automatic movements could only be stopped by force.

At a meeting in Breslau Meschede [b] rendered an account of a man who suffered from simple misdirection of movement without any mental derangement. If from his own desire, or by direction of others, he wanted to attempt any muscular movement, his muscles performed the exact opposite to his inclinations. If he desired to look to the right, his eyes involuntarily moved to the left. In this case the movement was not involuntary, as the

[a] Penins. and Ind. Med. Jour., Detroit, 1859–60, ii., 14. [b] 465, Oct., 1876, 474.

muscles were quiet except when called to action by the will, and then they moved to the opposite.

Presentiment, or divination of approaching death, appearing to be a hypothetic allegation, has been established as a strong factor in the production of a fatal issue in many cases in which there was every hope for a recovery. In fact several physicians have mentioned with dread the peculiar obstinacy of such presentiment. Hippocrates, Romanus, Moller, Richter, Jordani, and other older writers speak of it. Montgomery[a] reports a remarkable case of a woman suffering from carcinoma of the uterus. He saw her on October 6, 1847, when she told him she had a strong presentiment of death on October 28th. She stated that she had been born on that day, her first husband had died on October 28th, and she had married her second husband on that day. On October 27th her pulse began to fail, she fell into a state of extreme prostration, and at noon on the 28th she died. In substantiation of the possibility of the influence of presentiment Montgomery cites another case in which he was called at an early hour to visit a lady, the mother of several children. He found her apparently much agitated and distressed, and in great nervous excitement over a dream she had had, in which she saw a handsome monument erected by some children to their mother. She had awakened and became dreadfully apprehensive, she could not tell as to what. The uneasiness and depression continued, her pulse continued to grow weak, and she died at twelve that night without a struggle. Andrews[b] has made several observations on this subject, and concludes that presentiment of death is a dangerous symptom, and one which should never be overlooked. One of his cases was in a man with a fractured leg in the Mercy Hospital at Pittsburg. The patient was in good health, but one day he became possessed of a cool, quiet, and perfectly clear impression that he was about to die. Struck with his conviction, Andrews examined his pulse and general condition minutely, and assured the patient there was not the slightest ground for apprehension. But he persisted, and was attacked by pneumonia three days later which brought him to the verge of the grave, although he ultimately recovered. In another instance a young man of ruddy complexion and apparent good health, after an operation for varicocele, had a very clear impression that he would die. Careful examination showed no reason for apprehension. After five or six days of encouragement and assurance, he appeared to be convinced that his reasoning was foolish, and he gave up the idea of death. About the ninth day the wound presented a healthy, rosy appearance, and as the patient was cheerful he was allowed to leave his bed. After a few hours the nurse heard the noise of labored breathing, and on investigation found the patient apparently in a dying condition. He was given stimulants and regained consciousness, but again relapsed, and died in a few moments. At the necropsy the heart was found healthy, but there were two or three spots of

[a] 308, 1857, n. s., vol. iv., 18. [b] 526, 1872.

extravasated blood in the brain, and evidences of cerebral congestion. Vos[a] remarks that he remembers a case he had when dressing for Mr. Holden at St. Bartholomew's Hospital: "A man who had been intemperate was rolling a sod of grass, and got some grit into his left palm. It inflamed; he put on hot cow-dung poultices by the advice of some country friends. He was admitted with a dreadfully swollen hand. It was opened, but the phlegmonous process spread up to the shoulder, and it was opened in many places, and at last, under chloroform, the limb was amputated below the joint. The stump sloughed, and pus pointing at the back of the neck, an opening was again made. He became in such a weak state that chloroform could not be administered, and one morning he had such a dread of more incisions that, saying to us all standing round his bed, 'I can bear it no more, I must now die,' he actually did die in a few minutes in our presence. His was the last arm that Mr. Holden ever amputated at St. Bartholomew's."

[a] 224, 1895, ii., 460.

CHAPTER XVIII.

HISTORIC EPIDEMICS.

A short history of the principal epidemics, including as it does the description of anomalous diseases, many of which are now extinct, and the valuable knowledge which finally led to their extinction, the extraordinary mortalities which these epidemics caused, and many other associate points of interest would seem fitting to close the observations gathered in this volume. As the illustrious Hecker says, in the history of every epidemic, from the earliest times, the spirit of inquiry was always aroused to learn the machinery of such stupendous engines of destruction; and even in the earliest times there was neither deficiency in courage nor in zeal for investigation. "When the glandular plague first made its appearance as a universal epidemic, whilst the more pusillanimous, haunted by visionary fears, shut themselves up in their closets, some physicians at Constantinople, astonished at the phenomena, opened the boils of the deceased. The like has occurred both in ancient and modern times, not without favorable results for Science; nay, more mature views excited an eager desire to become acquainted with similar or still greater visitations among the ancients, but, as later ages have always been fond of referring to Grecian antiquity, the learned of those times, from a partial and meagre predilection, were contented with the descriptions of Thucydides, even where nature had revealed, in infinite diversity, the workings of her powers."

There cannot but be a natural interest in every medical mind to-day in the few descriptions given of the awful ravages of the epidemics which, fortunately, in our enlightened sanitary era, have entirely disappeared. In the history of such epidemics the name of Hecker stands out so prominently that any remarks on this subject must necessarily, in some measure, find their origin in his writings, which include exhaustive histories of the black death, the dancing mania, and the sweating sickness. Few historians have considered worthy of more than a passing note an event of such magnitude as the black death, which destroyed millions of the human race in the fourteenth century and was particularly dreadful in England. Hume has given but a single paragraph to it and others have been equally brief. Defoe has given us a journal of the plague, but it is not written in a true scientific spirit; and Caius, in 1552, gave us a primitive treatise on the sweating sickness. It

is due to the translation of Hecker's "Epidemics of the Middle Ages" by Babbington, made possible through the good offices of the Sydenham Society, that a major part of the knowledge on this subject of the English-reading populace has been derived.

The Black Death, or, as it has been known, the Oriental plague, the bubonic plague, or in England, simply the plague, and in Italy, "**la Mortalega**" (the great mortality) derived its name from the Orient; its inflammatory boils, tumors of the glands, and black spots, indicative of putrid decomposition, were such as have been seen in no other febrile disease. All the symptoms were not found in every case, and in many cases one symptom alone preceded death. Although afflicted with all the manifestations of the plague, some patients recovered. According to Hecker the symptoms of cephalic affliction were seen; many patients were stupefied and fell into a deep sleep, or became speechless from palsy of the tongue, while others remained sleepless and without rest. The fauces and tongue were black and as if suffused with blood; no beverage could assuage the burning thirst, so that suffering continued without alleviation until death, which many in their despair accelerated with their own hands. Contagion was evident, for attendants caught the disease from their parents and friends, and many houses were emptied of their inhabitants. In the fourteenth century this affection caused still deeper sufferings, such as had not been hitherto experienced. The organs of respiration became the seats of a putrid inflammation, blood was expectorated, and the breath possessed a pestiferous odor. In the West an ardent fever, accompanied by an evacuation of blood, proved fatal in the first three days. It appears that buboes and inflammatory boils did not at first appear, but the disease in the form of carbuncular affection of the lungs (anthrax artigen) caused the fatal issue before the other symptoms developed. Later on in the history of the plague the inflammatory boils and buboes in the groins and axillæ were recognized at once as prognosticating a fatal issue.

The history of this plague extends almost to prehistoric times. There was a pest in Athens in the fifth century before Christ. There was another in the second century, A. D., under the reign of Marcus Aurelius, and again in the third century, under the reign of the Gauls; following this was the terrible epidemic of the sixth century, which, after having ravaged the territory of the Gauls, extended westward. In 542 a Greek historian, Procopius, born about the year 500, gives a good description of this plague in a work, "Pestilentia Gravissima," so called in the Latin translation. Dupouy in "Le Moyen Age Médical,"[314] says that it commenced in the village of Peleuse, in Egypt, and followed a double course, one branch going to Alexandria and the other to Palestine. It reached Constantinople in the Spring of 543, and produced the greatest devastation wherever it appeared. In the course of the succeeding half century this epidemic became pandemic and spread over all the inhabited earth. The epidemic lasted four months in

Constantinople, from 5000 to 10,000 people dying each day. In his "History of France," from 417 to 591, Gregorius speaks of a malady under the name *inguinale* which depopulated the Province of Arles. In another passage this illustrious historian of Tours says that the town of Narbonne was devastated by a *maladie des aines*. We have records of epidemics in France from 567 to 590, in which bubonic symptoms were a prominent feature. About the middle of the fourteenth century the bubonic plague made another incursion from the East. In 1333, fifteen years before the plague appeared in Europe, there were terrible droughts in China followed by enormous floods in which thousands of people perished. There are traditions of a plague in Tche in 1334, following a drought, which is said to have carried off about 5,000,000 people. During the fifteen years before the appearance of the plague in Europe there were peculiar atmospheric phenomena all over the world, besides numerous earthquakes. From the description of the stinking atmosphere of Europe itself at this time it is quite possible that part of the disease came, not from China, but originated in Southern Europe itself. From China the route of caravans ran to the north of the Caspian Sea, through Asia, to Tauris. Here ships were ready to take the produce of the East to Constantinople, the capital of commerce, and the medium of communication between Europe, Asia, and Africa. Other caravans went from Europe to Asia Minor and touched at the cities south of the Caspian Sea, and lastly there were others from Bagdad through Arabia to Egypt; the maritime communication on the Red Sea to Arabia and Egypt was also not inconsiderable. In all these directions contagion found its way, though doubtless Constantinople and the harbors of Asia Minor were the chief foci of infection, whence it radiated to the most distant seaports and islands. As early as 1347 the Mediterranean shores were visited by the plague, and in January, 1348, it appeared in the south of France, the north of Italy, and also in Spain. Place after place was attacked throughout the year, and after ravishing the whole of France and Germany, the plague appeared in England, a period of three months elapsing before it reached London. The northern kingdoms were attacked in 1349, but in Russia it did not make its appearance before 1351.

As to the **mortality** of this fearful epidemic Dupouy considers that in the space of four years more than 75,000,000 fell victims, that is, about half of the population of the countries visited. Hecker estimates that from 1347 to 1351, 25,000,000 people died, or one-quarter of the total population of Europe. It was reported to Pope Clement that throughout the East, probably with the exception of China, nearly 24,000,000 people had fallen victims to the plague. Thirteen millions are said to have died in China alone. Constantinople lost two-thirds of its population. When the plague was at its greatest violence Cairo lost daily from 10,000 to 15,000, as many as modern plagues have carried off during their whole course. India was depopulated. Tartary, Mesopotamia,

Syria, Armenia, and Arabia were covered with dead bodies. In this latter country Arabian historians mention that Maara el nooman, Schisur, and Harem in some unaccountable manner remained free. The shores of the Mediterranean were ravaged and ships were seen on the high seas without sailors. In "The Decameron" Boccaccio gives a most graphic description of the plague and states that in Florence, in four months, 100,000 perished; before the calamity it was hardly supposed to contain so many inhabitants. According to Hecker, Venice lost 100,000; London, 100,000; Paris, 50,000; Siena, 70,000; Avignon, 60,000; Strasburg, 16,000; Norwich, 51,100. Dupouy says that in one month there were 56,000 victims in Marseilles, and at Montpellier three-quarters of the population and all the physicians were stricken with the epidemic.

Johanna of Burgundy, wife of King Philip VI. of Valois; Johanna II., Queen of Navarre, granddaughter of Philippe le Bel; Alphonse XI. of Castile, and other notable persons perished. All the cities of England suffered incredible losses. Germany seems to have been particularly spared; according to a probable calculation, only about 1,250,000 dying. Italy was most severely visited, and was said to have lost most of its inhabitants. In the north of Europe two of the brothers of Magnus, King of Sweden, died; and in Westgothland alone 466 priests died. The plague showed no decrease in the northern climates of Iceland and Greenland, and caused great havoc in those countries.

The moral effect of such a great pandemic plague can be readily surmised. The mental shock sustained by all nations during the prevalence of the black plague is beyond parallel and description. An awful sense of contrition and repentance seized Christians of every community. They resolved to forsake their vices, and to make restitution for past offenses; hence extreme religious fanaticism held full sway throughout Europe. The zeal of the penitents stopped at nothing. The so-called Brotherhood of the Cross, otherwise known as the Order of Flagellants, which had arisen in the thirteenth century, but was suppressed by the mandates and strenuous efforts of the Church, was revived during the plague, and numbers of these advocates of self-chastisement roamed through the various countries on their great pilgrimages. Their power increased to such an extent that the Church was in considerable danger, for these religious enthusiasts gained more credit among the people, and operated more strongly on their minds than the priests from whom they so entirely withdrew that they even absolved each other. Their strength grew with such rapidity, and their numbers increased to such an extent daily, that the State and the Church were forced to combine for their suppression. Degeneracy, however, soon crept in, crimes were committed, and they went beyond their strength in attempting the performance of miracles. One of the most fearful consequences of this frenzy was the persecution of the Jews. This alien race was given up to the merciless fury and cruelty of the populace.

The persecution of the Jews commenced in September and October, 1348, at Chillon on Lake Geneva, where criminal proceedings were instituted against them on the mythic charge of poisoning the public wells. These persecuted people were summoned before sanguinary tribunals, beheaded and burned in the most fearful manner. At Strasburg 2000 Jews were burned alive in their own burial-ground, where a large scaffold had been erected, their wealth being divided among the people. In Mayence 12,000 Jews were said to have been put to a cruel death. At Eslingen the whole Jewish community burned themselves in their synagogue, and mothers were often seen throwing their children on the pile, to prevent them from being baptized, and then precipitating themselves into the flames. The cruel and avaricious desires of the monarchs against these thrifty and industrious people added fuel to the flames of the popular passion, and even a fanatic zeal arose among the Jews to perish as martyrs to their ancient religion. When we sum up the actual effects as well as the after effects of the black death, we are appalled at the magnitude of such a calamity, the like of which the world had never seen before.

In the fifteenth and sixteenth centuries the plague was generally diffused throughout Europe, and in the latter half of the seventeenth century a final Occidental incursion of the plague took place. From 1603 to 1604 over 30,000 people perished in London from the plague, and in 1625 the mortality in that city amounted to 35,417 persons. But **the great plague of London** did not begin until 1664. In this plague the patient at first became sensible of great weariness and fatigue, had slight chills, nausea, vomiting, vertigo, and pains in the loins. The mental disturbance rapidly increased, and stupor and delirium ensued. The face was alternately flushed and pallid, and a sense of constriction was experienced in the region of the heart. Darting pains were felt all over the body, soon followed by the enlargement of the lymphatic glands, or by the formation of carbuncles in various parts of the body. About the third day the tongue became dry and brown, and the gums, tongue, and teeth were covered with a dark fur, and the excretions became offensive; paralysis intervened; ecchymosed patches or stripes due to extravasation appeared on the skin; finally the pulse sank, the body grew cold and clammy, delirium or coma seized the victim, and in five or six days, sometimes in two or three, the painful struggle was at an end.

It was supposed that the disease originated in the Orient and was brought to London from Holland. In his "Journal of the Plague in London" Defoe describes its horrors, and tells of the dead-cart which went through the streets gathering the victims. A few extracts from Pepys's "Diary," the evidence of an eye-witness and a contemporary, show the ghastly aspects of this terrible visitation. On August 31st he writes: "In the City, this week, died 7496, and of them 6102 died of the plague. But it is found that the true number of the dead this week is nearer 10,000; partly from the poor who cannot be

taken care of through the greatness of the number, and partly from the Quakers and others that will not have any bell rung for them." According to Adams, John Evelyn noted in his "Kalendarium":—"Sept. 7th.—Near 10,000 now died weekly; however, I went all along the City and suburbs from Kent street to St. James's, a dismal passage, and dangerous to see so many coffins exposed in the streets; the streets thin of people, the shops shut up, and all in silence, no one knowing whose turn might be next."

As the cold weather came on the plague diminished in intensity and the people regained their confidence and returned to the city. According to Adams,[a] in the first week of March, 1666, deaths by the plague had decreased to 42; and by the end of the month it was nearly extinct after carrying off about 100,000 victims. In our days we can hardly comprehend the filthy hygienic conditions under which the people in the cities lived, and it was probably to this fact that the growth and perpetuation of this plague was due.

As to the bubonic plague recently raging in Camptown, China, Mary Niles[b] says that it was the same disease as the great London plague, and was characterized mainly by glandular enlargement. It had not appeared in the Canton district for forty years or more, though it was endemic in Yunnan. In some places it began in the winter; and as early as January she herself found the first case in Canton in an infected house. In no case was direct contagiousness found to exist. The glands enlarged twelve hours after the fever began, and sometimes suppurated in nonfatal cases in a short time. Kitasato has recently announced the discovery of the specific cause of the bubonic plague.

Sweating Sickness.—According to Hecker, very shortly after Henry's triumphant march from Bosworth Field, and his entry into the capital on August 8, 1485, the sweating sickness began its ravages among the people of the densely populated city. According to Lord Bacon the disease began about September 21st, and lasted to the end of October, 1485. The physicians could do little or nothing for the people, and seemed to take no account of the clinical history of the disease,—in this respect not unlike the Greek physicians who for four hundred years paid no attention to small-pox because they could find no description of it in the immortal works of Galen. The causes seemed to be uncleanliness, gluttony, immoderate drinking, and also severe inundations leaving decaying vegetation. Richmond's army has been considered a factor in the germination of the seeds of pestilent disorder which broke out soon after in the camps of Litchfield, and on the banks of the Severn.

Sweating sickness was an inflammatory rheumatic fever, with great disorder of the nervous system, and was characterized by a profuse and injurious perspiration. In the English epidemic the brain, meninges, and the nerves were affected in a peculiar manner. The functions of the pneumo-

[a] "The Healing Art," London, 1887.

[b] 597, Oct. 13, 1894.

gastric nerves were violently disordered in this disease, as was shown by the oppressed respiration and extreme anxiety, with nausea and vomiting,—symptoms to which modern physicians attach much importance. The stupor and profound lethargy show that there was an injury to the brain, to which, in all probability, was added a stagnation of black blood in the torpid veins. Probably decomposing blood gave rise to the offensive odor of the person. The function of the lungs was considerably impaired. The petechial fever in Italy in 1505 was a form of the sweating sickness. There were visitations in 1506 and in 1515 in England. In 1517 the disease lasted full six months and reached its greatest height about six weeks after its appearance, but was apparently limited to England. Meningeal symptoms were characteristic of the third visitation of the disease. In 1528 and 1529 there was a fourth visitation which resulted in the destruction of the French Army before Naples. It is said that in 1524 a petechial fever carried off 50,000 people in Milan, and possibly this was the same disease. In 1529 the disease had spread all over Europe, attended with great mortality.

Germany, France, and Italy were visited equally. The famine in Germany, at this time, is described by authorities in a tone of deep sympathy. Swabia, Lorraine, Alsace, and provinces on the border of the lower Rhine were frightfully affected, so that the disease reached the same heights there as in France. In England Henry VIII. endeavored to avoid the epidemic by continual traveling, until at last he grew tired of so unsettled a life and determined to await his destiny at Tytynhangar. It was not the inhabitants of the land alone who were affected, but even fish and the fowls of the air sickened. According to Schiller, in the neighborhood of Freiburg in Breisgau, dead birds were found scattered under the trees with boils as large as peas under their wings,—indicating among them a disease, and this extended far beyond the southern districts of the Rhine. The disease was undoubtedly of a miasmatic infectious nature, as was proved by its rapid spread and the occasional absence of a history of contagion. It was particularly favored in its development by high temperature and humidity.

The moral effect of the sweating sickness, similar to that of the black plague, was again to increase religious fanaticism and recreate the zeal of persecution.

On the 15th of April, 1551, there was an outbreak of the fifth and last epidemic of sweating fever in Shrewsbury, on the Severn. With stinking mists it gradually spread all over England, and on the 9th of July it reached London. The mortality was very considerable. The English residents were particularly susceptible, foreigners being comparatively exempt. The epidemic terminated about the 30th of September. Since that time the sweating sickness has never reappeared in England; but in the beginning of the eighteenth century a disease very similar in symptoms and course broke out in Picardy, in Northern France. Toward the end of the century it spread

to the South of France, and since that time has appeared epidemically, 195 distinct outbreaks having been observed in the course of one hundred and sixty-nine years, from 1618 to 1787. The disease has frequently appeared in Italy since 1755, and in various parts of Germany since 1801. In Belgium it has been observed in a few places within the present century (Rohé).

Chronologic Table of the Principal Plagues.—In December, 1880, H. P. Potter, F. R. C. S., published a chronologic table of some of the principal plagues on record.[a] In comments on his table, Potter says that he has doubtless included mention of many plagues which, although described under that name, are probably a dissimilar disease, writers having applied the terms pestilential and pestilent in a generic sense to diseases specifically different. It must also be remembered that, in some cases, death must have been due to famine, want, and privation, which are so frequently coexistent with pestilence. Following the idea of Hecker, the dancing manias have been included in this table.

TABLE OF PLAGUES.

Date.	Locality.	Mortality.	Remarks.
B.C. 1495, . . .	Egypt, ...	. . .	During the reign of Pharaoh, King of Egypt, A.M. 2509.—Exodus xii.
1471, . . .	Desert of Paran, ...	14,000	. . .
1490, . . .	In the wilderness, ...	. . .	Numbers xi.
1310, . . .	Æguia (island of), ...	. . .	Ovid's Metam., lib. vii.
1141, . .	Ashdod, a place between Guza and Joppa, . .	. . .	Among the Philistines, 1 Sam. v. and vi.
1190, . . .	Troy (siege of), ...	. . .	In the Grecian camp, Homer's Iliad, lib. i.
1017, . . .	Canaan, ...	70,000 in three days,	In the time of David, 2 Sam. xxiv.
790, ...	Rome, ...	. . .	. . .
738, ...	Rome, ...	. . .	Plutarch's Life of Romulus.
710, ...	Rome, ...	185,000	Assyrian armies at the siege of Jerusalem.
694, . . . 671, . . .	. . . . .	. . . . .	Described by Livy.
545, ...	Velitrae, ...	Depopulated, .	Small town near Rome.
594, ...	Jerusalem, ...	One-third of inhabitants,	. . .
480, ...	Army of Xerxes, ...	150,000	. . .
476, ...	Spain, ...	. . .	. . .
463, ...	Rome, ...	. . .	Livy, iii., 6.
452, ...	Rome, ...	Half the inhabitants,	Livy, iii., 32.
430, ...	Athens, ...	. . .	Continued without interruption for five years.—Thucydides, ii., 48.
427, ...	Spain (from Egypt), . . .	. . .	. . .
404, ...	Carthage, ...	Depopulated, .	Justin, xix., 2; Diod. Sic., xiii.
393 and 383,	Gaul and Rome (armies of), ...	. . .	. . .
366, ...	Rome, ...	10,000 daily, .	Livy, vii., 1; Short, On Air.
362, ...	Murviedro (Sicily), . . .	. . .	. . .

[a] Jour. Statis. Soc. Lond., Dec., 1880.

TABLE OF PLAGUES.—*Continued.*

Date.	Locality.	Mortality.	Remarks.
B.C.			
346, . . .	Rome, ...	. . .	Livy.
332, . . .			
296, . . .			
291, . . .			
237, ...	Cadiz, ...	. . .	. . .
218, ...	Carthaginian armies, . . .	. . .	On their route to besiege Taguntum.
216, ...	Carthage, ...	. . .	. . .
213, . . .	Carthaginian and Roman armies, ...	. . .	Before Syracuse, Livy, xxv.
206, ...	Capua, ...	. . .	. . .
182–177, . .	Rome and all Italy, . . .	. . .	Livy, xli., 21.
144, ...	Rome, ...	. . .	. . .
140, ...	Rome, ...	. . .	. . .
134 and 130,	Italy, ...	. . .	. . .
126, ...	Numidia, ...	800,000	Orosius, lib. v.
. . .	Seacoast of Carthage, . .	200,000	
89, ...	Roman armies, ...	10,000	. . .
88, ...	Rome (people in), ...	30,000	. . .
60, ...	Spain, ...	. . .	? Leprosy.
A.D.			
68, ...	Rome, ...	. . .	Tacitus Annals, xv. Orosius, lib. vii.
114, ...	Wales, ...	45,000	. . .
187, ...	Rome and Italy, ...	. . .	. . .
158, ...	Arabia, ...	. . .	. . .
175 and 178,	Rome, ...	. . .	. . .
252, ...	Alexandria, ...	. . .	. . .
262, ...	Rome, ...	5,000 daily,	Zonaras, lib. xii.
310, ...	England, ...	40,000	. . .
325, ...	Britain, ...	. . .	. . .
365–394, . .	Italy and Syria, ...	. . .	. . .
400, ...	Asia, Africa, and Europe, .	71,719	Nicephorus, xiii.
450–67 and 473,	Rome, ...	. . .	. . .
562, ...	Scotland, ...	. . .	. . .
517, ...	Palestine, ...	. . .	. . .
544, ...	France, ...	. . .	? Dysentery.
565–610, .	Especially France, Germany, and Italy, . .	. . .	A plague raging, with intermissions, in most parts of the world.—Niceph., xvii.
590, ...	Rome, ...	. . .	. . .
654, ...	Constantinople, ...	. . .	. . .
664, ...	South Britain, ...	. . .	. . .
665–683, . .	England, ...	. . .	With intermissions.
696, ...	Constantinople, ...	. . .	. . .
703 and 713,	Scotland, ...	. . .	. . .
717, 724, and 729,	Constantinople, ...	30,000	. . .
732, . . .	Norwich in England, and Syria, ...	. . .	. . .
740, . . .	Various parts of Europe and the East, ...	. . .	Raged for 260 years.
762, ...	Wales. In Chichester, . .	34,000	. . .
853, ...	Scotland, ...	. . .	. . .
896, ...	Gaul, Germany, and Italy,	. . .	. . .
937, ...	England, ...	. . .	. . .
940, ...	North of Europe, ...	. . .	Affecting chiefly the cattle.

TABLE OF PLAGUES.—*Continued.*

Date.	Locality.	Mortality.	Remarks.
A.D.			
964, ...	. . .	. . .	Emperor Otho's army.
1005, . . .	. . .	Half the human race,	Raged for three years.
1012–25, .	England and other parts of Europe, ...	. . .	With intermissions.
1027, . . .	. . .	. . .	Convulsive disease; dance of St. Vitus.
1029–31 and 1033,	England and Gaul, . . .	. . .	. . .
1064, . . .	Saracen army, ...	Many thousands, . .	Marching to invade Rome; raged for two years.
1068, . . .	York and Durham, . . .	. . .	. . .
1075, . . .	Constantinople, ...	. . .	. . .
1096–1111, .	Europe (various parts), . .	. . .	. . .
1120, . . .	Various parts of the globe,	. . .	Lasted 272 years.
1126–28, 1133–46,	England, ...	. . .	. . .
1172, . . .	England, ...	. . .	? Dysentery.
1183, . . .	England and Rome, . . .	. . .	. . .
1193–96, 1200–1201,	England, ...	. . .	. . .
1217, . . .	Damietta, ...	Only 3 persons out of 70,000 survived, .	. . .
1235, . . .	London, ...	20,000	. . .
1237, . . .	Egypt, ...	. . .	Dancing disease among the children.
1278, . . .	Utrecht, ...	. . .	Dancing mania.
1283, . . .	Spain, ...	4,000	King Philip of France invaded Spain with 20,000 infantry and 8,600 cavalry.
1335, . . .	England, ...	Great mortality,	. . .
1345, . .	Spain, and spread over the whole world, . .	Leaving scarcely a quarter of the human race,	. . .
1346, . . .	Florence, ...	60,000	. . .
1347, . . .	London, ...	50,000	. . .
. . .	Venice, ...	100,000	. . .
. . .	Lubeck, ...	90,000	. . .
. . .	Spain, ...	200,000	. . .
1348, . . .	Syria, Greece, Italy, Cyprus,	. . .	. . .
1350–51, . .	Ireland, ...	. . .	. . .
1352, . . .	China, ...	900,000	. . .
. . .	London, ...	50,000	Interred in one graveyard.
1355, . . .	Florence, ...	100,000	. . .
. . .	Norwich, ...	37,104	. . .
. . .	Yarmouth, ...	7,502	. . .
1363, . . .	Spain, ...	. . .	. . .
1365, . . .	Cologne, ...	20,000	. . .
1368–70, . .	England and Ireland, . .	. . .	. . .
1371, . . .	Barcelona, ...	. . .	. . .
1372, . .	Germany, Egypt, Greece, and all the East, . . .	Lubeck, 90,000	. . .
1374, . .	Holland, France, and Rhenish provinces, . .	. . .	Dancing disease of St. Vitus or St. John.
1379, . . .	England, ...	. . .	. . .
1383, . . .	Seville, ...	. . .	. . .
1384, . .	Mallorca, ...	. . .	. . .
1387, . . .	Portugal, ...	. . .	. . .
1391, . .	England, York, and Norfolk especially, . . .	. . .	. . .

TABLE OF PLAGUES.—*Continued.*

Date.	Locality.	Mortality.	Remarks.
A.D.			
1394, . . .	Spain, ...	. . .	. . .
1401, . . .	London, ...	30,000	. . .
1410, . . .	Seville, ...	. . .	. . .
1418, . . .	Strasburg, ...	. . .	Dancing disease.
1429, . . .	Barcelona, ...	. . .	. . .
1439, . .	Huescar in the kingdom of Aragon, ...	. . .	. . .
1450, . .	Italy, Gaul, Germany, and Spain, ...	. . .	. . .
1465, . . .	Italy, ...	. . .	. . .
1468, . . .	Parma, ...	. . .	. . .
1482, . . .	France, ...	. . .	. . .
1485, . . .	Seville, ...	. . .	"Sweating sickness" in England.
1488, . . .	Andalusia, ...	. . .	. . .
1489, . . .	Barcelona, ...	. . .	. . .
1493, . . .	Mallorca, ...	. . .	. . .
1495, . . .	Saragossa, ...	. . .	. . .
1499, . . .	Britain, ...	London, 30,000,	Spread to Brabant, Flanders, etc.
1529, . . .	England, ...	. . .	. .
1530, . . .	Germany, ...	. . .	Sweating sickness.
1535, . . .	Cork and Dresden, ...	. . .	. . .
1537–39, . .	England, ...	. . .	. . .
1541, . . .	Constantinople, ...	. . .	. . .
1543, . . .	Metz, ...	. . .	. . .
1547, . .	England, Holland, and Germany, ...	. . .	. . .
1556, . . .	Spain, ...	. . .	Spotted fever.
1558, . . .	Murcia, ...	. . .	. . .
1562, . .	London and most of the principal cities of Europe, ...	. . .	. . .
1564, . . .	Barcelona, ...	Saragossa, 10,000	. . .
1565, . . .	Lyons, ...	. .	. . .
1566, . . .	"Morbus Hungaricus," .	. . .	. . .
1570, . . .	Spain, ...	. . .	. . .
1572, . . .	Dresden, ...	. . .	. . .
1574, . . .	Spain and Italy, ...	. . .	. . .
1579, . . .	Rome, ...	4,000	. . .
. . .	Lubeck, ...	8,000	. . .
. . .	Hamburg, ...	3,000	. . .
1580–81, . .	Cairo and the East, . . .	500,000	. . .
1582, . . .	Spain, especially Cadiz, .	. . .	. . .
1585–86, .	Narva and Revel, in Livonia, ...	Revel, 6,000	. . .
1589, . . .	Seville, ...	. . .	. . .
1590, . . .	Dresden, ...	. . .	. . .
1593, . . .	Malta, ...	70,000 in Lisbon and Spain,	. . .
1600–1602, .	Muscovy, ...	500,000	. . .
. . .	Livonia, ...	30,000	. . .
1603, . . .	London, ...	36,000	. . .
. . .	Paris, ...	2,000 weekly,	. . .
1606, . . .	Throughout Europe, . . .	. . .	. . .
1609, . . .	Seville, ...	. . .	. . .
1610, . . .	Granada, ...	. . .	. . .
. . .	Constantinople, ...	200,000	. . .
1613, . .	France and Constantinople, ...	. . .	. . .
1616, . .	Germany, Denmark, Egypt, and Levant, .	. . .	. . .

TABLE OF PLAGUES.—*Continued.*

Date.	Locality.	Mortality.	Remarks.
A.D.			
1622, . . .	London, ...	1st year, 8,000 2d " 11,000 3d " 12,000 4th " 35,417	Lasted four years.
1625, . . .	Throughout England, . .	London, 30,000	. . .
1626, . . .	Lyons, ...	60,000	. . .
1634, . . .	Dresden, ...	. . .	. . .
1635, . . .	Leyden and Nineguen, . .	Leyden, 20,000	. . .
. . .	. . .	London, 10,000	. . .
1644, . . .	Madrid, ...	. . .	. . .
1649, . . .	Spain, ...	200,000	. . .
1653, . . .	Moscow, ...	200,000	. . .
. . .	Riga, ...	9,000	. . .
. . .	Amsterdam, ...	13,200	. . .
. . .	Leyden, ...	13,000	. . .
1656, . . .	Naples, ...	240,000	Three-quarters of the inhabitants.
. . .	Benevento, ...	9,000	. . .
. . .	Genoa, ...	10,000	. . .
. . .	Rome, ...	10,000	. . .
. . .	Neapolitan territories, . .	400,000	. . .
1662, . . .	Venice, ...	60,000	. . .
1663, . . .	England, ...	. . .	. . .
1664, . . .	Amsterdam, ...	24,000	. . .
1665, . . .	London, ...	68,596	. . .
1673, . . .	Spain, ...	. . .	. . .
1675, . . .	Malta, ...	11,300	. . .
1677, . . .	Murcia and Carthagena, .	. . .	. . .
1679, . . .	Germany, ...	. . .	. . .
1691, . . .	Germany, ...	. . .	. . .
1698, . . .	Spain, ...	. . .	. . .
1705, . . .	Ceuta, ...	. . .	. . .
1710, . . .	Copenhagen, ...	25,000	In six months, the "sweating sickness."
. . .	Stockholm, ...	30,000	. . .
1720, . . .	Marseilles, ...	. . .	. . .
1722, . .	Vienna, Hungary, and in the East, ...	. . .	. . .
1727, . . .	Spain, ...	. . .	Epidemic mania.
1732, . . .	London, ...	1,500 in one week, .	. . .
1735, . . .	Egypt, ...	Many thousands, . .	. . .
1736, . . .	Cairo, ...	100,000	7,000 buried daily for some days.
1740, . . .	Ireland, ...	. . .	. . .
1743, . . .	Aleppo, ...	. . .	. . .
1751, . . .	Cordova, ...	40,000 in Cairo and Constantinople, . .	. . .
1751–60, . .	Ireland and France, . .	30,000 in Cyprus, . . .	. . .
1761, . . .	Carthagena, ...	. . .	. . .
1762, . .	Aleppo, Jerusalem, and Damascus, ...	. . .	. . .
1763, . . .	Naples, ...	20,000	. . .
1769, . . .	Bengal, ...	"3 millions and upward,"	. . .
1770, . . .	Poland and Russia, . . .	20,000	. . .
. . .	Bohemia, ...	168,000	. . .
. . .	Constantinople, ...	1,000 buried daily for some weeks,	. . .

TABLE OF PLAGUES.—*Continued.*

Date.	Locality.	Mortality.	Remarks.
A.D.			
1771, . . .	Moscow, ...	133,299 in 18 months, .	. . .
. . .	Bassora, ...	80,000	. . .
1783–85, .	Egypt, Dalmatia, Constantinople, etc., . .	. . . .	. . .
1792, . . .	Egypt, ...	800,000	. . .
1799, . . .	Barbary, ...	3,000 daily,	In the French army in Egypt.
. . .	Fez, ...	247,000	. . .
1809, . . .	Portugal, ...	. . .	Among British troops.
1810, . . .	Gibraltar, ...	Out of 14,000 only 28 escaped, . .	. . .
1812, . . .	Constantinople, ...	160,000	. . .
1813, . . .	Malta, ...	4,483	. . .
1815, . . .	Corfu, ...	. . .	. . .
1817, . .	Throughout the habitable globe, ...	. . .	. . .
1841, . .	Syria, especially about Erzeroum, ...	. . .	Dancing mania.
1843, . . .	Asiatic Turkey, ...	. . .	. . .
1844, . . .	Egypt, ...	. . .	. . .
1873–76, . .	Mesopotamia, ...	20,000 in 1876,	. . .
1877, . . .	Resht, near the Caspian, .	. . .	. . .

Small-pox.—From certain Chinese records it appears that small-pox, or a disease with similar symptoms, was known in China before the Christian era, and it was supposed to have been known at a very early period in India. Most likely it was introduced into Europe in the second century by a Roman army returning from Asia. Before the sixth century, the terrible century of the great plague, there seem to be no records of small-pox or other eruptive fevers. Neither Hippocrates, Galen, nor the Greek physicians who practised at Rome, mention small-pox, although it is now believed that the Emperor Marcus Aurelius died of this disease. According to Dupouy, the first document mentioning variola was in 570 A. D., by Marius, a scholar of Avenches, in Switzerland. (*"Anno 570, morbus validus cum profluvio ventris, et variola, Italiam Galliamque valde affecit."*) Ten years later Gregory of Tours describes an epidemic with all the symptoms of small-pox in the fifth reign of King Childebert (580); it started in the region of Auvergne, which was inundated by a great flood; he also describes a similar epidemic in Touraine in 582. Rhazes, or as the Arabs call him, Abu Beer Mohammed Ibn Zacaríyá Ar-Razi, in the latter part of the ninth century wrote a most celebrated work on small-pox and measles, which is the earliest accurate description of these diseases, although Rhazes himself mentions several writers who had previously described them, and who had formulated rules for their cure. He explained these diseases by the theory of fermentation, and recommended the cooling treatment. Adams remarks that although it is probable that small-pox existed for ages in Hindoostan and China, being completely isolated

in those countries from the European world, it was not introduced into the West until the close of the seventh century. Imported into Egypt by the Arabians, it followed in the tracks of their conquests, and was in this way propagated over Europe. The foregoing statement disagrees with Dupouy and others. It is well known that small-pox was prevalent in Europe before Rhazes's description of it, and after the Crusades it spread over Central and Western Europe, but did not extend to the northern countries until some years later. In 1507 the Spaniards introduced it into San Domingo, and in 1510 into Mexico, where it proved a more fatal scourge than the swords of Cortez and his followers, for according to Robertson it swept away in Mexico three millions and a half of people. In 1707 it appeared in Iceland, and carried off more than one-fourth of its inhabitants; in 1733, according to Collinson, it almost depopulated Greenland. The Samoyeds, Ostiaks, and other natives of Eastern Siberia, have frequently suffered from devastating epidemics. In Kamchatka the disease was introduced in 1767, and many villages were completely depopulated. According to Moore, at the beginning of the eighteenth century nearly one-fourteenth of the population died from small-pox in England, and at the end of the century the number of the victims had increased to one-tenth. In the last century the statement was made in England that one person in every three was badly pock-marked. The mortality of the disease at the latter half of the eighteenth century was about three to every thousand inhabitants annually. India has always been a fertile ground for the development of small-pox, and according to Rohé[a] the mortality from small-pox has been exceedingly great for the past twenty years. From 1866 to 1869, 140,000 persons died in the Presidencies of Bombay and Calcutta, and several years later, from 1873 to 1876, 700,000 died from this disease. China, Japan, and the neighboring countries are frequently visited with small-pox, and nearly all the inhabitants of Corea are said to bear evidences of the disease. In the Marquesas Islands one-fourth of the inhabitants had fallen victims to the disease since 1863. It was first introduced into the Sandwich Islands in 1853, and it then carried off eight per cent. of the natives. Australia, Tasmania, New Zealand, and the Fiji Archipelago have to the present day remained exempt from small-pox; although it has been carried to Australia in vessels, rigorous quarantine methods have promptly checked it. On the American continent it was believed that small-pox was unknown until the conquest of Mexico. It has been spread through various channels to nearly all the Indian tribes of both North and South America, and among these primitive people, unprotected by inoculation or vaccination, its ravages have been frightful.

That small-pox—a disease so general and so fatal at one time—has, through the ingenuity of man, in civilized communities at least, become almost extinct, is one of the greatest triumphs of medicine.

[a] "Text-Book of Hygiene," Phila., 1890.

Inoculation was known in Europe about 1700, and in 717 the famous letter of Lady Montagu from Adrianople was issued, containing in part the following statements :—

"The small-pox, so fatal and so general amongst us, is here entirely harmless, by the invention of ingrafting, which is the term they give it. There is a set of old women who make it their business to perform the operation every autumn in the month of September, when the great heat is abated. People send to one another to know if any of their family has a mind to have the small-pox; they make parties for this purpose, and when they are met, the old woman comes with a nut-shell full of the matter of the best sort of small-pox, and asks what vein you please to have opened. She immediately rips open that you offer her with a large needle, and puts into the vein as much matter as can lie upon the head of her needle, and after that binds up the little wound with a hollow shell, and in this manner opens four or five veins."

Soon after this letter Lady Montagu had her son inoculated in Turkey, and four years later her daughter was to be the first subject inoculated in England. She made rapid progress notwithstanding the opposition of the medical profession, and the ignorance and credulity of the public. The clergy vituperated her for the impiety of seeking to control the designs of Providence. Preaching in 1722, the Rev. Edward Massey, for example, affirmed that Job's distemper was confluent small-pox, and that he had been inoculated by the Devil. Lady Montagu, however, gained many supporters among the higher classes. In 1721 Mead was requested by the Prince of Wales to superintend the inoculation of some condemned criminals, the Prince intending afterward to continue the practice in his own family; the experiment was entirely successful, and the individuals on whom it was made afterward received their liberty (Adams).

According to Rohé, inoculation was introduced into this country in 1721 by Dr. Zabdiel Boylston of Boston, who had his attention directed to the practice by Cotton Mather, the eminent divine. During 1721 and 1722 286 persons were inoculated by Boylston and others in Massachusetts, and six died. These fatal results rendered the practice unpopular, and at one time the inoculation hospital in Boston was closed by order of the Legislature. Toward the end of the century an inoculating hospital was again opened in that city.

Early in the eighteenth century inoculation was extensively practised by Dr. Adam Thomson of Maryland, who was instrumental in spreading a knowledge of the practice throughout the Middle States.

Despite inoculation, as we have already seen, during the eighteenth century the mortality from small-pox increased. The disadvantage of inoculation was that the person inoculated was affected with a mild form of small-pox, which, however, was contagious, and led to a virulent form in uninoculated persons.

As universal inoculation was manifestly impracticable, any half-way measure was decidedly disadvantageous, and it was not until vaccination from cow-pox was instituted that the first decided check on the ravages of small-pox was made.

Vaccination was almost solely due to the persistent efforts of **Dr. Edward Jenner,** a pupil of the celebrated John Hunter, born May 17, 1749.

In his comments on the life of Edward Jenner, Adams, in "The Healing Art," has graphically described his first efforts to institute vaccination, as follows: "To the ravages of small-pox, and the possibility of finding some preventive Jenner had long given his attention. It is likely enough that his thoughts were inclined in this direction by the remembrance of the sufferings inflicted upon himself by the process of inoculation. Through six weeks that process lingered. He was bled, purged, and put on a low diet, until 'this barbarism of human veterinary practice' had reduced him to a skeleton. He was then exposed to the contagion of the small-pox. Happily, he had but a mild attack; yet the disease itself and the inoculating operations, were probably the causes of the excessive sensitiveness which afflicted him through life.

"When Jenner was acting as a surgeon's articled pupil at Sudbury, a young countrywoman applied to him for advice. In her presence some chance allusion was made to the universal disease, on which she remarked: 'I shall never take it, for I have had the cow-pox.' The remark induced him to make inquiries; and he found that a pustular eruption, derived from infection, appeared on the hands of milkers, communicated from the teats of cows similarly disordered; this eruption was regarded as a safeguard against small-pox. The subject occupied his mind so much that he frequently mentioned it to John Hunter and the great surgeon occasionally alluded to it in his lectures, but never seems to have adopted Jenner's idea that it might suggest some efficacious substitute for inoculation. Jenner, however, continued his inquiries, and in 1780 he confided to his friend, Edward Gardner, his hope and prayer that it might be his work in life to extirpate small-pox by the mode of treatment now so familiar under the name of vaccination.

"At the meetings of the Alveston and Radborough Medical Clubs, of both of which Jenner was a member, he so frequently enlarged upon his favorite theme, and so repeatedly insisted upon the value of cow-pox as a prophylactic, that he was denounced as a nuisance, and in a jest it was even proposed that if the orator further sinned, he should then and there be expelled. Nowhere could the prophet find a disciple and enforce the lesson upon the ignorant; like most benefactors of mankind he had to do his work unaided. Patiently and perseveringly he pushed forward his investigations. The aim he had in view was too great for ridicule to daunt, or indifference to discourage him. When he surveyed the mental and physical agony inflicted

by the disease, and the thought occurred to him that he was on the point of finding a sure and certain remedy, his benevolent heart overflowed with unselfish gladness. No feeling of personal ambition, no hope or desire of fame, sullied the purity of his noble philanthropy. 'While the vaccine discovery was progressive,' he writes, 'the joy at the prospect before me of being the instrument destined to take away from the world one of its greatest calamities, blended with the fond hope of enjoying independence, and domestic peace and happiness, were often so excessive, that, in pursuing my favorite subject among the meadows, I have sometimes found myself in a kind of reverie. It is pleasant to recollect that those reflections always ended in devout acknowledgments to that Being from whom this and all other blessings flow.' At last an opportunity occurred of putting his theory to the test. On the 14th day of May, 1796,—the day marks an epoch in the Healing Art, and is not less worthy of being kept as a national thanksgiving than the day of Waterloo—the cow-pox matter or pus was taken from the hand of one Sarah Holmes, who had been infected from her master's cows, and was inserted by two superficial incisions into the arms of James Phipps, a healthy boy of about eight years of age. The cow-pox ran its ordinary course without any injurious effect, and the boy was afterward inoculated for the small-pox,—happily in vain. The protection was complete; and Jenner thenceforward pursued his experiments with redoubled ardor. His first summary of them, after having been examined and approved by several friends, appeared under the title of 'An Inquiry into the Causes and Effects of the Variolæ Vaccinæ,' in June, 1798. In this important work he announced the security against the small-pox afforded by the true cow-pox, and proceeded to trace the origin of that disease in the cow to a similar affection of the horse's heel."

This publication produced a great sensation in the medical world, and vaccination spread so rapidly that in the following summer Jenner had the indorsement of the majority of the leading surgeons of London. Vaccination was soon introduced into France, where Napoleon gave another proof of his far-reaching sagacity by his immediate recognition of the importance of vaccination. It was then spread all over the continent; and in 1800 Dr. Benjamin Waterhouse of Boston introduced it into America; in 1801, with his sons-in-law, President Jefferson vaccinated in their own families and those of their friends nearly 200 persons. Quinan [a] has shown that vaccination was introduced into Maryland at least simultaneously with its introduction into Massachusetts. De Curco introduced vaccination into Vienna, where its beneficial results were displayed on a striking scale; previously the average annual mortality had been about 835; the number now fell to 164 in 1801, 61 in 1802, and 27 in 1803. After the introduction of vaccination in England the mortality was reduced from nearly 3000 per million inhabitants annually to 310 per million annually. During the small-pox epidemic in

[a] 510, June 23 and 30, 1883.

London in 1863, Seaton and Buchanan examined over 50,000 school children, and among every thousand without evidences of vaccination they found 360 with the scars of small-pox, while of every thousand presenting some evidence of vaccination, only 1.78 had any such traces of small-pox to exhibit. Where vaccination has been rendered compulsory, the results are surprising. In 1874 a law was established in Prussia that every child that had not already had small-pox must be vaccinated in the first year of its life, and every pupil in a private or public institution must be revaccinated during the year in which his or her twelfth birthday occurs. This law virtually stamped small-pox out of existence; and according to Frölich[a] not a single death from small-pox occurred in the German army between 1874 and 1882. Notwithstanding the arguments advanced in this latter day against vaccination, the remembrance of a few important statistic facts is all that is necessary to fully appreciate the blessing which Jenner conferred upon humanity. In the last century, besides the enormous mortality of small-pox (it was computed that, in the middle of the last century, 2,000,000 victims perished in Russia from small-pox), the marks of affliction, blindness, deafness, etc., were plain in at least one member of every family.

Asiatic cholera probably originated centuries ago in India, where it is now endemic and rages to such an extent as to destroy 750,000 inhabitants in the space of five years. There is questionable evidence of the existence of cholera to be found in the writings of some of the classic Grecian and Indian authors, almost as far back as the beginning of the Christian era. In the sixteenth and seventeenth centuries travelers in the East gave accounts of this disease. Sonnerat, a French traveler, describes a pestilence having all the characteristics of Asiatic cholera which prevailed in the neighborhood of Pondicherry and the Coromandel coast from 1768 to 1769, and which, within a year, carried off 60,000 of those attacked. According to Rohé, Jasper Correa, an officer in Vasco da Gama's expedition to Calicut, states that Zamorin, the chief of Calicut, lost 20,000 troops by the disease. Although cholera has frequently extended to Europe and America, its ravages have never been nearly as extensive as in the Oriental outbreaks. An excellent short historic sketch of the epidemics of the cholera observed beyond the borders of India has been given by Rohé.[b] In 1817 cholera crossed the boundaries of India, advancing southeasterly to Ceylon, and westerly to Mauritius, reaching the African coast in 1820. In the following two years it devastated the Chinese Empire and invaded Japan, appearing at the port of Nagasaki in 1822. It advanced into Asiatic Russia, and appeared as far east as St. Petersburg in 1830, from whence it spread north to Finland. In 1831 it passed through Germany, invading France and the western borders of Europe, entering the British Isles in 1832, and crossing the Atlantic Ocean for the first time, appeared in Canada, having been carried thence by some Irish emigrants.

[a] "Militär-Medicin," p. 461.

[b] Loc. cit., p. 315.

From Canada it directly made its way to the United States by way of Detroit. In the same year (1832) it appeared in New York and rapidly spread along the Atlantic coast.

"During the winter of 1832 it appeared at New Orleans, and passed thence up the Mississippi Valley. Extending into the Indian country, causing sad havoc among the aborigines, it advanced westward until its further progress was stayed by the shores of the Pacific Ocean. In 1834 it reappeared on the east coast of the United States, but did not gain much headway, and in the following year New Orleans was again invaded by way of Cuba. It was again imported into Mexico in 1833. In 1835 it appeared for the first time in South America, being restricted, however, to a mild epidemic on the Guiana coast.

"In 1846 the disease again advanced beyond its natural confines, reaching Europe by way of Turkey, in 1848. In the autumn of this year it also appeared in Great Britain, Belgium, the Netherlands, Sweden, and the United States, entering by way of New York and New Orleans. In the succeeding two years the entire extent of country east of the Rocky Mountains was invaded. During 1851 and 1852 the disease was frequently imported by emigrants, who were annually arriving in great numbers from the various infected countries of Europe. In 1853 and 1854 cholera again prevailed extensively in this country, being, however, traceable to renewed importation of infected material from abroad. In the following two years it also broke out in numerous South American States, where it prevailed at intervals until 1863. Hardly had this third great pandemic come to an end before the disease again advanced from the Ganges, spreading throughout India, and extending to China, Japan, and the East Indian Archipelago, during the years 1863 to 1865. In the latter year it reached Europe by way of Malta and Marseilles. It rapidly spread over the Continent, and in 1866 was imported into this country by way of Halifax, New York, and New Orleans. This epidemic prevailed extensively in the Western States, but produced only slight ravages on the Atlantic Coast, being kept in check by appropriate sanitary measures. In the same year (1866) the disease was also carried to South America, and invaded for the first time the states bordering on the Rio de la Plata and the Pacific coast of the Continent.

"Cholera never entirely disappeared in Russia during the latter half of the sixth decade, and in 1870 it again broke out with violence, carrying off a quarter of a million of the inhabitants before dying out in 1873. It spread from Russia into Germany and France and was imported, in 1873, into this country, entering by way of New Orleans and extending up the Mississippi Valley. None of the Atlantic coast cities suffered from this epidemic in 1873, and since that year the United States has been entirely free from the disease, with the exception of a few imported cases in New York harbor in 1887" (and in 1893).

In 1883 an epidemic of cholera raged in Egypt and spread to many of the Mediterranean ports, and reappeared in 1885 with renewed violence. In Spain alone during this latter epidemic the total number of cases was over one-third of a million, with nearly 120,000 deaths. In 1886 cholera caused at least 100,000 deaths in Japan. In the latter part of 1886 cholera was carried from Genoa to Buenos Ayres, and crossing the Andean range invaded the Pacific coast for a second time. In Chili alone there were over 10,000 deaths from cholera in the first six months of 1887. Since then the entire Western hemisphere has been virtually free from the disease.

In 1889 there was an epidemic of cholera in the Orient; and in 1892 and 1893 it broke out along the shores of the Mediterranean, invading all the lines of commerce of Europe, Hamburg in the North and Marseilles in the South being especially affected. In the summer of 1893 a few cases appeared in New York Bay and several in New York city, but rigorous quarantine methods prevented any further spread.

Typhus fever is now a rare disease, and epidemics are quite infrequent. It has long been known under the names of hospital-fever, spotted-fever, jail-fever, camp-fever, and ship-fever, and has been the regular associate of such social disturbances as overcrowding, excesses, famine, and war. For the past eight centuries epidemics of typhus have from time to time been noticed, but invariably can be traced to some social derangement.

Yellow Fever is a disease prevailing endemically in the West Indies and certain sections of what was formerly known as the Spanish Main. Guitéras recognizes three areas of infection:—

(1) The focal zone from which the disease is never absent, including Havana, Vera Cruz, Rio, and the other various Spanish-American points.

(2) The perifocal zone, or regions of periodic epidemics, including the ports of the tropical Atlantic and Africa.

(3) The zone of accidental epidemics, between the parallels of 45° north and 35° south latitude.

In the seventeenth century Guadaloupe, Dominica, Martinique, and Barbadoes suffered from epidemics of yellow fever. After the first half of the seventeenth century the disease was prevalent all through the West Indies. It first appeared in the United States at the principal ports of Boston, Philadelphia, and Charleston, in 1693, and in 1699 it reappeared in Philadelphia and Charleston, and since that time many invasions have occurred, chiefly in the Southern States.

The epidemic of 1793 in Philadelphia, so graphically described by Matthew Carey, was, according to Osler, the most serious that has ever prevailed in any city of the Middle States. Although the population of the city was only 40,000, during the months of August, September, October, and November the mortality, as given by Carey, was 4041, of whom 3435 died in the months of September and October. During the following ten years epidemics of a lesser degree

occurred along the coast of the United States, and in 1853 the disease raged throughout the Southern States, there being a mortality in New Orleans alone of nearly 8000. In the epidemic of 1878 in the Southern States the mortality was nearly 16,000. South America was invaded for the first time in 1740, and since 1849 the disease has been endemic in Brazil. Peru and the Argentine Republic have also received severe visitations of yellow fever since 1854. In Cuba the disease is epidemic during June, July, and August, and it appears with such certainty that the Revolutionists at the present time count more on the agency of yellow fever in the destruction of the unacclimated Spanish soldiers than on their own efforts.

Leprosy is distinctly a malady of Oriental origin, and existed in prehistoric times in Egypt and Judea. It was supposed to have been brought into Europe by a Roman army commanded by Pompey, after an expedition into Palestine. Leprosy was mentioned by several authors in the Christian era. France was invaded about the second century, and from that time on to the Crusades the disease gradually increased. At this epoch, the number of lepers or ladres becoming so large, they were obliged to confine themselves to certain portions of the country, and they took for their patron St. Lazare, and small hospitals were built and dedicated to this saint. Under Louis VIII. 2000 of these hospitals were counted, and later, according to Dupouy, there were 19,000 in the French kingdom. Various laws and regulations were made to prevent the spread of the contagion. In 1540 it was said that there were as many as 660 lepers in one hospital in Paris.

No mention is made in the Hippocratic writings of elephantiasis græcorum, which was really a type of leprosy, and is now considered synonymous with it. According to Rayer, some writers insist that the affection then existed under the name of the Phœnician disease. Before the time of Celsus, the poet Lucretius first speaks of elephantiasis græcorum, and assigns Egypt as the country where it occurs. Celsus gives the principal characteristics, and adds that the disease is scarcely known in Italy, but is very common in certain other countries. Galen supplies us with several particular but imperfect cases—histories of elephantiasis græcorum, with a view to demonstrate the value of the flesh of the viper, and in another review he adds that the disease is common in Alexandria. Aretæus has left a very accurate picture of the symptoms of elephantiasis græcorum; and Pliny recapitulates the principal features and tells us that the disease is indigenous in Egypt. The opinion of the contagiousness of elephantiasis græcorum which we find announced in Herodotus and Galen is more strongly insisted upon by Cælius Aurelianus who recommends isolation of those affected. Paulus Ægenita discusses the disease. The Arabian writers have described elephantiasis græcorum under the name of juzam, which their translators have rendered by the word lepra. Later, Hensler, Fernel, Paré, Vesalius, Horstius, Forestus, and others have discussed it.

The statistics of leprosy in Europe pale before the numbers affected in the East. The extent of its former ravages is unknown, but it is estimated that at the present day there are over 250,000 lepers in India, and the number in China is possibly beyond computation. According to Morrow, in 1889 in the Sandwich Islands there were 1100 lepers in the settlement at Molokai. Berger states that there were 100 cases at Key West; and Blanc found 40 cases at New Orleans. Cases of leprosy are not infrequently found among the Chinese on the Pacific coast, and an occasional case is seen in the large cities of this country. At the present day in Europe, where leprosy was once so well known, it is never found except in Norway and the far East.

Possibly few diseases have caused so much misery and suffering as leprosy. The banishment from all friends and relatives, the confiscation of property and seclusion from the world, coupled with poverty and brutality of treatment,—all emphasize its physical horror a thousandfold. As to the leper himself, no more graphic description can be given than that printed in *The Nineteenth Century*, August, 1884: "But leprosy! Were I to describe it no one would follow me. More cruel than the clumsy torturing weapons of old, it distorts, and scars, and hacks, and maims, and destroys its victim inch by inch, feature by feature, member by member, joint by joint, sense by sense, leaving him to cumber the earth and tell the horrid tale of a living death, till there is nothing left of him. Eyes, voice, nose, toes, fingers, feet, hands, one after the other are slowly deformed and rot away, until at the end of ten, fifteen, twenty years, it may be, the wretched leper, afflicted in every sense himself, and hateful to the sight, smell, hearing, and touch of others, dies, despised and the most abject of men."

Syphilis.—Heretofore the best evidence has seemed to prove that syphilis had its origin in 1494, during the siege of Naples by Charles VIII. of France; but in later days many investigators, prominent among them Buret, have stated that there is distinct evidence of the existence of syphilis in prehistoric times. Buret finds evidence of traces of syphilis among the Chinese five thousand years ago, among the Egyptians at the time of the Pharaohs, among the Hebrews and Hindoos in biblic times, and among the Greeks and Romans after Christ. Some American writers claim to have found evidences of syphilitic disease in the skulls and other bones of the prehistoric Indian mounds, thus giving further evidence to the advocates of the American origin of syphilis. The Spaniards claimed that, returning from America in 1493, Columbus brought with him syphilis. Friend says: "One thing is remarkable; the Spaniards, upon their first expedition to America, brought home from thence this contagious disorder, and soon after carried another affection thither, the small-pox, of which the Indian Prince Montezuma died." The first descriptions of syphilis are given under the name of *morbus gallicus*, while the French in return called it *morbus neapolitanus* or *mal d'Italie*. The name of syphilis was said to have been

first given to it by a physician of Verona, in a poem describing the disease. Inspired by heroic epics Fracastor places before us the divinities of paganism, and supposes that a shepherd, whom he called Syphilus, had addressed words offensive to Apollo, and had deserted his altars. To punish him the God sent him a disease of the genitals, which the inhabitants of the country called the disease of Syphilus.

"*Syphilidemque ab eo labem dixêre coloni.*" [a]

Buret traces the origin of the word syphilis from σύν, with, and φιλία, love, the companion of love; which means in plain language that the pox is a disease transmitted more especially by venereal relations. The first great epidemic of syphilis occurred between 1493 and 1496, and attacked all ranks, neither the Church nor the Crown being spared. The ravages of this disease were increased by the treatment with mercury which soon afterward was found in proper doses to be a specific in this disease. It is possible that the terrible manifestations of syphilis of which we read in the older writers were in a great measure due to the enormous doses of mercury. At the present day syphilis is universally prevalent. In his excellent monograph Sturgis estimated in New York, in 1873, that one out of 18 suffered from it; and White of Philadelphia pronounces the opinion that "not less than 50,000 people in that city are affected with syphilis." According to Rohé, on this basis Gihon estimates the number of syphilitics in the United States at one time as 2,000,000.

To-day no disease, except possibly tuberculosis, is a greater agency in augmenting the general mortality and furthering sickness than syphilis. Its hereditary features, the numerous ways in which it may be communicated outside of the performance of the sexual act, and the careful way in which it is kept from the sanitary authorities render it a scourge which, at the present day, we seem to have no method of successfully repressing.

Modern Mortality from Infectious Diseases.—As to the direct influence on the mortality of the most common infectious diseases of the present day, **tuberculosis,** universally prevalent, is invariably in the lead. No race or geographic situation is exempt from it. Osler mentions that in the Blood Indian Reserve of the Canadian Northwest Territories, during six years, among a population of about 2000 there were 127 deaths from pulmonary consumption. This enormous death-rate, it is to be remembered, occurred in a tribe occupying one of the finest climates of the world, among the foothills of the Rocky Mountains, a region in which consumption is extremely rare among the white population, and in which cases of tuberculosis from the Eastern provinces do remarkably well. Mayo-Smith [b] quotes a table illustrating the annual deaths (based on the returns from 1887 to 1891) from certain infectious diseases per 10,000 European inhabitants. The figures for each disease give a rough measure of its prevalence in different countries. The large figures as to small-pox show the absence in Italy and

[a] "Hieronymi Fracastorii," Veronæ, 1530. [b] Statistics and Sociology, New York, 1885.

Austria of vaccination; diphtheria seems to be very fatal in Germany and Austria; Italy has a large rate for typhoid fever, and the same is true of the other fevers; France, Germany, and Austria show a very large rate for tuberculosis, while Italy has a small rate.

DEATHS FROM CERTAIN DISEASES PER 10,000 INHABITANTS.

COUNTRY.	SMALL-POX.	MEASLES.	SCARLET FEVER.	DIPHTHERIA.	TYPHOID FEVER.	TUBERCULOSIS.
Italy,	3.86	6.17	2.99	6.08	7.49	13.61
France (cities),	2.3	5.18	3.1	6.66	5.32	33.
England,	0.11	4.68	2.31	1.74	1.9	16.09
Ireland,	0.01	2.01	1.22	0.76	2.33	21.15
Germany (cities),	0.04	2.8	2.15	10.21	2.11	31.29
Prussia,	0.03	3.2	2.46	14.17	2.26	28.06
Austria,	4.43	5.36	5.57	13.2	5.42	37.2
Switzerland,	0.06	1.53	1.22	3.53	1.47	21.07
Belgium,	1.52	6.2	1.62	5.77	3.83	19.87
Holland,	0.02	3.93	0.38	1.45	2.5	19.21
Sweden,	0.01	2.3	3.69	3.89	2.22	. .

Based upon the Tenth Census Reports, we figure that of every 10,000 inhabitants of the United States the number of deaths for the census year from similar diseases was as follows:—

	Rural.	Cities.
Measles,	1.62	1.54
Scarlet Fever,	2.84	5.54
Diphtheria,	7.53	8.
Croup,	3.51	4.08
Typhoid Fever,	4.75	3.46
Tuberculosis,	16.29	28.55

The general average of deaths from small-pox was about 0.14.

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